

# Barriers and Enablers to Sciencepreneurship in Austria – an empirical analysis

A Master's Thesis submitted for the degree of  
“Master of Business Administration”

supervised by  
Assoc. Prof. Dr. Peter Keinz

Thomas Joham, BSc.

00730580

## Affidavit

I, **THOMAS JOHAM, BSC.**, hereby declare

1. that I am the sole author of the present Master's Thesis, "BARRIERS AND ENABLERS TO SCIENCEPRENEURSHIP IN AUSTRIA – AN EMPIRICAL ANALYSIS", 90 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

Vienna, 16.06.2019

---

Signature

# Abstract

A lot of researchers in technical fields in Austria produce great results in research and development of new technologies or methods in various fields. This knowledge is usually in a state where it is ready to get commercialized via numerous channels. Nevertheless, not many of these technologies or methods reach the market as products or services. This thesis focuses on finding barriers and enablers for Sciencepreneurship in Austria in an empirical study. A sciencepreneur is a university employee or student who founds a company to commercialize an invention created at the university. The main focus will be on universities and research institutions located in Austria.

To find barriers and enablers, three groups have been investigated - Researchers, Technology Transfer Offices (TTOs) and Spin-offs. The three groups have been interviewed in a qualitative interview process. Further, the obtained data has been coded and categorized to find overarching enablers and barriers for Sciencepreneurship in Austria.

It can be concluded that in the empirical study 11 barriers and 11 enablers have been identified and described. Among the most important enablers for Sciencepreneurs in Austria are “incubation, acceleration and services” as well as a comprehensive “university and knowledge transfer strategy”. Additionally, strong partnerships and cooperation as well as integrated entrepreneurial education are very important for successful spin-offs.

The main barriers with the highest frequency for Sciencepreneurs in Austria are the currently implemented incentive schemes and the success measures for scientists which do not foster entrepreneurship. Additionally, a perceived barrier is the IP and patent process and the career inflexibility for researchers.

The found enablers and barriers describe the phenomenon, that not many great ideas in science can be transferred to products on the market, in a better way. Out of the enablers and barriers, policy makers, universities or research institutions can now define focus points and adaptations in their strategies and policies.

## Keywords

Academic Entrepreneurship, Sciencepreneurs, Sciencepreneurship, Knowledge Transfer, Spin-off, Technology Transfer, Barriers and Enablers

# Acknowledgement

To my wife Kate and my parents (Maria and Horst) for their love and support.

To my mentors Elisabeth, Günther and Wolfgang – thank you for your continuous support and mentorship.

Thomas Joham, BSc.

## Table of contents

1. Introduction .....	5
2. Literature Review .....	6
2.1 Technology transfer of universities .....	7
2.3 Barriers and enablers of university spin-offs .....	9
2.3.1 Responsibilities of research institutions .....	9
2.3.2 The importance of Technology Transfer Offices .....	10
2.3.3 Incubation, Acceleration and funding possibilities .....	10
2.3.4 Licensing and Patent process .....	12
2.3.5 Motivation, Mindset and the job as a researcher .....	13
2.3.6 Entrepreneurial education .....	13
2.3.7 Financing and risk capital .....	14
2.3.8 Partnerships with parent facility .....	14
2.3.9 Missing business knowledge of researchers .....	15
2.3.10 Academic success measures and incentive schemes .....	15
2.3.11 Summary of enablers and blockers in literature .....	16
3. Method and logic of research .....	17
4. Results .....	18
4.1 Interviews and Interviewees .....	18
4.2 Interview analysis – subthemes and codes .....	20
4.3 Barriers and Enablers from TTO’s perspective .....	32
4.4 Barriers and Enablers from Researchers perspective .....	34
4.5 Barriers and Enablers from Spin-offs perspective .....	36
4.6 Similarities / Dissimilarities .....	38
5. Interpretation and discussion .....	39
5.1 Barriers .....	39

---

5.2 Enablers.....	46
5.3 Contribution to further research .....	52
6. Conclusion.....	54
7. References .....	56
Appendix .....	A
Interview Template .....	A
TTO's .....	A
Researcher .....	E
Spin-off.....	H
Interview Summaries: .....	K
TTO interviews .....	K
Researcher interviews .....	N
Spin-off interviews .....	R

## List of figures

Figure 1: Barriers and Enablers frequency by the interviewed TTOs.....	34
Figure 2: Barriers and enablers frequency by the interviewed researchers.....	36
Figure 3: Barriers and enablers frequency by the interviewed spin-offs .....	38
Figure 4: Barriers and enablers frequency named by all interviewees across the three groups	39
Figure 5: Crucial barriers for Sciencepreneurship in Austria .....	46
Figure 6: Crucial enablers for Sciencepreneurship in Austria .....	52

## List of tables

Table 1: Found enablers and barriers in literature.....	16
Table 2: Career pattern and corresponding codes .....	20
Table 3: Entrepreneurial education and corresponding codes .....	21
Table 4: Environment for Scientists and corresponding codes .....	22
Table 5: Incentivization and role as a scientist and corresponding codes.....	23
Table 6: Incubation, Acceleration and Services and corresponding codes .....	25
Table 7: IP and Patent Process and corresponding codes .....	26
Table 8: Mindset and Motivation and corresponding codes .....	27
Table 9: Partnerships and Cooperations with corresponding codes.....	29
Table 10: Product development and corresponding codes.....	30
Table 11: Resources and Infrastructure with corresponding codes.....	30
Table 12: University and knowledge transfer strategy and corresponding codes.....	32

---

Table 13: All barriers named by the interviewed TTO's.....	32
Table 14: All enablers named by the interviewed TTO's.....	33
Table 15: All barriers named by the interviewed Researchers.....	35
Table 16: All enablers named by the interviewed Researchers .....	35
Table 17: All barriers named by the interviewed Spin-offs.....	37
Table 18: All enablers named by the interviewed Spin-offs.....	37
Table 19: Overview of barriers discovered in literature compared to the barriers discovered in this study .....	44
Table 20: Barriers which add new insights to existing literature.....	45
Table 21: Overview of barriers discovered in literature compared to the enablers discovered in this study .....	51
Table 22: Enablers which add new insights to existing literature.....	52



# 1. Introduction

A lot of researchers in technical fields in Austria produce great results in research and development of new technologies or methods in various fields. This knowledge should be commercialized via numerous channels (Mueller, 2006) (Marzocchi, et al., 2017) (Schartinger, et al., 2006) (Schartinger, et al., 2001).

To stay competitive as a small country, such as Austria, capabilities need to be built up and an understanding needs to exist that economies required to create, build, and absorb new technologies as indicated in the study of Klofsten & Jones-Evans, (Klofsten & Jones-Evans, 2000). Therefore, governments and policy makers in Europe should continue to foster the technology transfer and introduce new innovation strategies. The biggest and best European program of this kind is called Horizon 2020, (European Commission, 2018). Horizon 2020 heavily focuses on basic research projects, as well as their application in small and medium businesses. The program's goal is to make Europe a gravity center of excellent research and innovation again. (Wirtschaftskammer Österreich, 2018)

Nevertheless, the phenomenon that promising research results are there but not reach the market as products can be observed and described as latent. This thesis shall find in an empirical study barriers and enablers for Sciencepreneurship in Austria. The main focus lies on universities and research institutions in Austria.

## Main research question:

“What are barriers and enablers for researchers at universities towards the technology transfer via spinoffs in Austria?”

Derived from this research question, the focus should be on the following sub questions.

- What are specific barriers that hinder or block the transformation of ideas / solutions into spin-offs for academics at universities in Austria?
- What are specific enablers for academics that boost spin-off creation at universities in Austria?

---

This thesis addresses the outlined challenge for researchers at technical universities, as well as for researchers in technical research institutions in Austria. Moreover, the thesis addresses the topic from various viewpoints. The thesis aims to find and describe barriers and enablers for researchers and potential spin-offs to make technology transfer via spin-offs more likely. The found enablers and barriers should be used further in research to prepare for policy changes or for changes in knowledge transfer strategies and institutional structures.

The thesis is structured as follows:

**Section 2** consists of an extensive literature review to technology transfer and interaction between universities and industry, as well as, barriers and enablers of Sciencepreneurship. The literature review also describes multiple knowledge transfer concepts derived from research and practice.

**Section 3** describes the method of research in detail. Here, a detailed description of the empirical study and analysis methods can be found.

**Section 4** outlines plain results of the empirical study

**Section 5** provides a discussion of the result of the empirical study. In this section, concrete recommendations based on the results in Section 4 can be found.

**Section 6** concludes the study and summarizes the findings.

## 2. Literature Review

As part of a project from European Commission called the KEINS project (Knowledge-based Entrepreneurship: Innovation, Networks and Systems) scholars from Bocconi University in Milan defined the term “academic entrepreneur.”

*“the academic entrepreneur (AE) is a university scientist, most often a professor, sometimes a PhD student or a post-doc researcher, who sets up a business company in order to commercialize the results of his / her research. „ (Franzoni & Lissoni, 2006)(p2)*

The scholars of Bocconi paid attention to keep the definition as close to the term “entrepreneurship” as possible. Nevertheless, the definition was enriched by the scientific

facet (Franzoni & Lissoni, 2006). This thesis draws on the definition of “Sciencepreneurs” of the scholars Franzoni & Lissoni, due to the well-balanced definition between scientist and entrepreneurship, and which fits well with the research question. In this thesis, a sciencepreneur is a university employee or student, who founds a company to commercialize an invention created at the university.

In addition, the subsequent technology or method used to create the firm was developed at a university with which founders were affiliated. This could, also, mean that the newly-founded company took over or licensed patents from the parent organization (Smilor, et al., 1990). This thesis focuses on Spin-offs that use technology developed by a university or research institution because it is considered a major enabler to successfully spin off a company. The Spin-off focus is, also, important because it addresses the research question regarding finding enablers and barriers for university/research institution spin-offs.

## 2.1 Technology transfer of universities

There are various ways knowledge transfers can be accomplished from the scientific world to the industry world. Usually, this is organized in knowledge transfer channels called “knowledge filters”, also known as the gap between knowledge creation and its commercialization. Knowledge filters are very important to foster entrepreneurship at universities (Kolb & Wagner, 2018). For this thesis, it is very important to know how the knowledge transfer is organized at universities or at research institutions.

Technology transfer at universities usually consist of several options: spin-offs, contract research, cooperative research projects, or by cooperatively-supervised PhD or master theses (Schartinger, et al., 2001) & (Schartinger, et al., 2006). Studies of Schartinger provide evidence that in Austria the main knowledge transfer occurs through hiring of highly-skilled human capital. This holds true for hiring new staff, but also for specialized training for employees working in the public sector (Schartinger, et al., 2001). This is measured by another study from Schartinger et.al. He outlines that 2 % of the research budget of the universities is financed by the business sector in Austria (Schartinger, et al., 2001). This represents a low number and indicates a high potential for improvement. In relation to the research question, it shows that there is room for additional concepts in knowledge commercialization. This may be seen as an enabler when the public policies change to make spin-offs more likely.

---

As shown in the study of Mueller et al., there is a strong relationship between knowledge transfer and economic regional growth (Mueller, 2006). This would mean that encouraged knowledge transfer strengthens the economy, which leads to prosperity and growth. Scientific centers where special industries are the focus can also fuel research in respective areas. Mueller et al. shows in his paper that many big firms do not fully utilize unexploited knowledge because they usually rely on the development of existing product pipelines. Nevertheless, it is outlined in the study that university knowledge transfer via spin-offs can result in exploiting underutilized knowledge and contribute to economical regional growth. To achieve this, the knowledge needs to be transformed from a university to an economically digestible output (Mueller, 2006).

However, exploitation of university knowledge is for various firms a method of knowledge transfer (Kolb & Wagner, 2018). That is the reason why technology transfer is back on the agenda of the policy makers around the globe. In Austria, technology transfers from universities are getting more and more attention from the local government and from international agencies, like OECD<sup>1</sup>. In the OECD, regional outlook for Austria in 2017 (OECD, 2017) a section was included – in the policy package of 2017 January the passus encourages the expansion of support for business angels and seed funding resources such as the financing of university spin-offs (OECD, 2017).

## 2.2 Intellectual Property Rights

To foster further growth of the university spin-off landscape, policy makers all over the world introduced IPR<sup>2</sup> strategies that clarify who holds the property right of publicly funded research outcomes. This can either be the scientist, the university, or the participating firm (Franzoni & Lissoni, 2006). This applies as well to the Austrian system. These changes in the past were necessary so universities could benefit from scientific inventions produced by their researchers. In Austria, publicly funded research outcomes that lead to an IPR belong to the university and not to the scientist. (Franzoni & Lissoni, 2006)

---

<sup>1</sup> The Organisation for Economic Co-operation and Development (OECD; French: Organisation de coopération et de développement économiques, OCDE)

<sup>2</sup> IPR = Intellectual Property Right

---

However, not only IPR rules changed; the methods of performance evaluation of universities were adapted, as well. Knowledge transfer, spin-offs, and patents are meanwhile a measure of university performance. (Schartinger, et al., 2006)

Usually, filing a patent to secure IPR of an invention is not a straightforward and easy process, especially for researchers. Therefore, to help researchers with patenting and to give legal advice, most universities in Europe, as well universities in Austria, introduced Technology Transfer Offices<sup>3</sup>. In US, this happened as aftermath of the Bayh-Dole Act in 1980. (Siegel, 2018) Those TTOs made it easier for the university and the researcher to file a patent for an invention. In the long run, this helped the university to earn additional money via licensing. Additionally, patents and spin-offs increase the university's reputation, which helps in obtaining more funding for R&D projects. (Hayter, et al., 2018) The TTO usually evaluates if the invention is patentable. If a TTO is not filing a patent with the researcher together, the IPR is returned to the researcher. This is the current practice in Austria. Nevertheless, literature outlines that science happens in a proof of concept mode, and, in general, the invention is not developed as far as needed to be good enough for a marketable product. (Franzoni & Lissoni, 2006) An additional problem with licensing technologies that are patented is that most firms on the market cannot develop an invention into a marketable product within their own power. The literature claims that a connection to the scientist is always needed. (Franzoni & Lissoni, 2006)

## 2.3 Barriers and enablers of university spin-offs

### 2.3.1 Responsibilities of research institutions

Besides the high potential for universities in entrepreneurship the study of Marzocchi et al. shows a very ambivalent view on the responsibilities of a university (Marzocchi, et al., 2017). Teaching and science are divergent from participation in entrepreneurial ventures. This also leads to the discussion of the role of the university or research institution in a spin-off venture. Marzocchi outlined in this study that the knowledge transfer strategies can be very different across Europe. (Marzocchi, et al., 2017) Besides that, scientific breakthroughs in research facilities and universities can be seen as a major contribution to industry opportunities. (Schartinger, et al., 2006) To commercialize scientific breakthroughs, universities need to develop some capabilities to support this type of knowledge transfer. Siegel et al. classified in

---

<sup>3</sup> TTO = Technology Transfer Offices

his research the main problems of technology transfer at universities. Foremost, there is an informal and cultural barrier between universities and firms. Secondly, there is an insufficient reward system for scholars and faculty members. Additionally, another impediment that was identified was the experiences and capabilities of the employees of the TTOs. Here, Siegel et al. stated that business knowledge is desperately needed by spin-offs, but also business knowledge is needed by the TTO employees to find ways of ideal commercialization. (Siegel, 2018)

### 2.3.2 The importance of Technology Transfer Offices

Munari, et al. explained in their paper the big advantages of TTOs, consisting mainly of the support for the scholars to commercialize knowledge and foster the knowledge transfer (Munari, et al., 2018). The old way of thinking that TTOs should only help in patent questions is not valid anymore, as observed in the literature. Entrepreneurial capability is meanwhile equally important for successful technology transfer according to Siegel (Siegel, 2018). Meanwhile, TTOs in Austria offer a wide array of different services. The service offerings range from funding advisory, patent and license management, industry partnerships, event organization, incubation and acceleration, entrepreneurial education, and networking. (TU Graz, 2018) (TU Wien, 2018) Many of the TTOs are engaged in incubators and have a broad network from which scientists can profit. TTOs usually work as intermediaries between innovators and those who potentially want or can commercialize the inventions (Siegel, 2018). This definitely can be seen as advantage for knowledge transfer in Austria. As outlined in the paper of De Nicola et al. improving quality and patent activity consequentially fosters spin-off growth with good financial performance indicators. To improve spin-off activity at universities, universities need to put more attention on innovation activities and patent protection. (De Nicola, et al., 2018) In Austria, the major technical universities have their own TTOs, as outlined before. As an additional supporting factor, the study of Munari et al. outlines that proof of concept offices and university seed funds are beneficial for future spin-offs. (Munari, et al., 2018) Proof of concept offices help researchers to further develop the proof of concept and make a minimum viable product for the market entry.

### 2.3.3 Incubation, Acceleration and funding possibilities

In Austria, there is the Austrian Research promotion agency (FFG,) which promotes innovation and seed funding for scientific proof of concept initiatives. (FFG, 2018) Other funding agencies

---

in Austria are Austrian Wirtschafts Service (AWS) and the Vienna business agency. (ABA, 2018). The Austrian Wirtschafts Service is the Austrian federal promotion bank. (AWS, 2018). Additionally, there is the funding agency COMET (Competence Centers for Excellent Technologies) which links companies and universities. (FFG, 2018) (ABA, 2018)

Enabling factors, such as incubation and acceleration, are also offered manifold in Austria. INITS<sup>4</sup>, for example, offers a founding incubator at the Technical University in Vienna. This incubator is offered in cooperation with the University of Vienna and the Wirtschaftsagentur Wien. Additionally, the Incubator INITS is part of the APlusB program. The goal of INITS is to increase the success stories of startups and spin-offs in the region of Vienna. INITS is part of the top academic incubators in Europe. In the DACH<sup>5</sup> region, INITS is clearly the number one incubator, according to the literature. INITS offers all services expected from an incubator. This ranges from financing, coaching, and training, and a network and community. Additionally, a startup camp is offered. (INITS, 2018)

Other incubators are offered at University of Technology Graz<sup>6</sup> with the research and technology house. The research and technology house provide scientists with focused support in terms of business cooperation and research funds. This includes a TU Graz funding program, as well as, participation in research-focused campaigns to foster knowledge transfer and strengthen the region. The technology house is more focused on academics and their projects, however, there is spin-off and startup support available. This includes research labs, competence centers, as well as, startup incubators<sup>7</sup>. The spin-off services are offered within the cooperation with Science Park Graz, where the university is a majority shareholder. (TU Graz, 2018). Successful spin-offs and startups can be found in the interactive startup and spin-off map of the TU Graz. (TU Graz, 2019)

Another high-tech incubator is offered with Science Park Graz. This incubator is one of the biggest in Austria, according to the literature. Science Park is an initiative supported by the government and universities designed for academics who want to start a firm. Science Park Graz supports students, alumni, and researchers in developing their ideas to get ready for funding. Additionally, Science Park offers a network to investors and mentors, coaching, and

---

4 INiTS Universitäres Gründerservice Wien GmbH

5 DACH = Combined region out of Germany (D), Austria (A) and Switzerland (CH)

<sup>6</sup> TU Graz = University of Technology Graz

<sup>7</sup> <https://www.tugraz.at/tu-graz/universitaet/unternehmensbeteiligungen/>

---

infrastructure. TU Graz holds 50 % of Science Park. The other 50 % is held by University Graz. (Science Park Graz GmbH, 2018)

Academia plus Business (APLUSB) is an association and network combining all scientific incubator programs from different universities in all Austrian counties. It is supported by the Austrian Ministry of Transport, Innovation, and Technology (APLUSB, 2018) and the Horizon 2020 project by the European Commission. (European Commission, 2018)

These initiatives and established TTOs can clearly be interpreted as enablers for scientific spin-offs in Austria. In the literature, it is outlined that services provided by the university or other facilities for entrepreneurial support can be very helpful in early stage spin-offs (Hayter, et al., 2018).

#### 2.3.4 Licensing and Patent process

However, TTOs have some disadvantages (e.g., TTOs often require secrecy over the invention to be able to patent it, etc.) This conflicts with the usual open research policy of universities. As long as the patent is not granted, the breakthrough is not allowed to be published; otherwise, it cannot be patented anymore. This is seen as barrier in the literature. It is dangerous as well for spin-offs to hold onto patented technology for too long. It is outlined in the literature that it is crucial that the spin-offs assess whether or not the scope of used technologies needs to be extended (Hayter, et al., 2018). The TTOs influence the spin-off development significantly, as shown in the study of Kolb & Wagner (Kolb & Wagner, 2018). As mentioned by Hayter et al., TTOs are often mistrusted by researchers (Hayter, et al., 2018). Scholars do not believe that TTOs can provide the necessary networks for spin-offs. Research, however, shows that TTOs are a critical source for spin-offs to market exposure (Hayter, et al., 2018). As outlined by Siegel et al., speed matters nowadays also at TTOs. The faster the TTO is in patenting ideas, the greater the revenues for the university and the higher the spin-off rate (Siegel, 2018). Nevertheless, patents filed by universities in Europe are not negligible. It is hard to measure, though, because an exception was made a detour was taken that scientists can engage with public companies in research projects with contracts where the patent lies with the public firm in the end. As outlined, an academic spin-off ecosystem in Austria is available.



### 2.3.5 Motivation, Mindset and the job as a researcher

Shown in the literature research from Hayter et al., it strongly depends on the network and the collaboration of the supporting environment. Moreover, Hayter et al. discusses the importance of the general culture and environment for spin-offs in the university and the departments, as well as, in the respective regions (Hayter, et al., 2018).

One of the key elements in commercializing scientific output is the researcher him or herself. The work of Jain et al. outlines the cognitive and psychological changes the role of a scientist needs to undergo when participating in the commercialization process (Jain, et al., 2009). Scientists need to transition into a hybrid role that allows them to stay a researcher but become an entrepreneur. Due to the different facets of entrepreneurs and researchers, this step is necessary, and the study of Jain et al. reveals that this is not as easy as it sounds (Jain, et al., 2009). Furthermore, it is discussed in the literature what influences researchers' decisions to commercialize ideas (Jain, et al., 2009). The study and the interviews outline that scientists mostly choose a hybrid role that overlays commercial and academic aspects when commercializing scientific breakthroughs (Jain, et al., 2009).

### 2.3.6 Entrepreneurial education

Kolb & Wagner and Hayter, et al. summarizes in the article that an entrepreneurial environment created by research institution or university is very important. This has a network effect among the scholars. The more scholars see entrepreneurial colleagues, the more likely they go this way, too (Kolb & Wagner, 2018) (Hayter, et al., 2018). Moreover, Kolb & Wagner discovered there are differences in the needs of university spin-offs. The scholars clustered the spin-offs into four groups: sciencepreneurs, professorialpreneurs, postdoctorialpreneurs, and contextpreneurs. Each and every one out of the four spin-off types needs different connections to universities, support structures, and resources (Kolb & Wagner, 2018). Literature shows that it is a big support factor if the university offers entrepreneurial education to its staff and students. Additionally, it is recommended to build incubator or acceleration programs close or near campus as outlined in the study of Siegel (Siegel, 2018). These fuels entrepreneurial activity in the long run (Hayter, et al., 2018) & (Hanh, 2019).

### 2.3.7 Financing and risk capital

Scholars around Franzoni & Lissoni have examined downsides of academic startups, such as usage of students as low paid workers and scientific distraction that is not necessarily in favor of the universities in Europe (Franzoni & Lissoni, 2006). Another downside is the lack of available capital for investment, which is necessary to spin-off. This limits the ability of knowledge transfer and commercialization of university inventions (Munari, et al., 2018).

If we focus on Austria, it is clear there is a gap in funding and risk capital. As outlined by Hayter et al., it's a very common problem observed in the academic literature (Hayter, et al., 2018). The advantages of venture capital (VC) or funding partners in the region can be tremendous, in terms of industry contacts and risk capital (Hayter, et al., 2018) (Siegel, 2018). In Austria, there is a small network of business angels and angel investors, but there is a lack of risk capital investors, which are needed to fuel growth. This can be illustrated with the example of the financial technology (fintech) startup N26. The bank, N26, was founded by two people from Vienna, in Vienna. In the first month, however, they shifted their startup to Berlin, Germany. The reason, as stated in the Interview in DerStandard, was that back then Berlin had a well-established startup scene. It was simply easier to hire talent and to secure funding (Hanh, 2019). Meanwhile, N26 has become one of Europe's unicorns (Co, 2019) & (Dillet, 2019).

### 2.3.8 Partnerships with parent facility

As indicated by Steffensen et al., support from the parent facility is needed, especially in the early phases of the newly created spin-off (Steffensen, et al., 2000). As indicated by Klofsten & Evans, usually the universities are supportive in terms of commercializing knowledge (Klofsten & Jones-Evans, 2000). As both studies outline, it is important that support functions and support structures, such as TTOs, are built by the university or by the industries (Klofsten & Jones-Evans, 2000) & (Steffensen, et al., 2000). Smilor et al. indicates that the university is the most important organizational factor in startups or spin-offs (Smilor, et al., 1990). As the study of Siegel shows, spin-offs with close ties to the parent facility have greater success in the long run (Siegel, 2018). In the research of Marzocchi et al., this is seen as an important asset in commercializing, and it outlines the universities capability in promoting entrepreneurship (Marzocchi, et al., 2017). Nevertheless, there are possible conflicts, as in other areas, between the parent facility and the spin-off. The article outlines the different viewpoints and interests in the partnership between parent facility and startup. Whereas the university is interested in

royalties and licensing, the firm is interested in developing and commercializing the licensed idea. Problems can occur at a later stage, in terms of intellectual property or relevance for the university. In a broader perspective, the spin-off from research facilities is seen from both parties as a win-win (Siegel, 2018). As outlined in the study of Schartinger et al., the interaction between universities and spin-offs is very difficult for universities due to the strong contrast in culture, speed, and application orientation of spin-offs (Schartinger, et al., 2001).

### 2.3.9 Missing business knowledge of researchers

Problems of university spin-offs are more related to business concerns rather than to technical concerns (Smilor, et al., 1990). As shown in van Greenhuizen & Soetanto, the majority of startups coming from university see marketing knowledge, sales skills, uncertainty in management, and a shortage of cashflow and financing as major obstacles for successful growth (van Geenhuizen & Soetanto, 2009). For universities, spin-offs can create a major advantage in terms of financing research activity, especially if government funds are cut. Here, the literature uncovers the differences between USA and Europe (Franzoni & Lissoni, 2006) & (Kolb & Wagner, 2018). Not only in terms of funding, this is an advantage for the university. Spin-offs can contribute successfully to promote recent research results and create publicity for technological breakthroughs (Smilor, et al., 1990)

### 2.3.10 Academic success measures and incentive schemes

Defining academic success and the separation from other terms as student success in academia is a very complex topic as described in (York, et al., 2015). Part of academic success is teaching evaluation and publications. In Austria and in Europe, there is no major motivation for researchers to spin-off or create a startup. At least in the normal systems, it is not part of the evaluation scheme of academic success. The literature indicates that some universities and institutions are very supportive and enable researchers to create spin-offs. However, even if researchers are enabled, it is always a big stretch for the researcher and for the university (Klofsten & Jones-Evans, 2000) (Marzocchi, et al., 2017). Nevertheless, the literature outlines that there is increasing pressure from funding agencies to be more proactive and foster knowledge transfer to public firms (Smilor, et al., 1990) & (Jain, et al., 2009). In America, this phenomenon was determined already in the '90s. Universities were establishing incubators to enhance and foster the transfer of knowledge to newly created firms (Smilor, et al., 1990).

A big blocker is the incentivization of researchers to go in the entrepreneurial direction. Literature around Hayter et al. outlines that policy makers need to find another incentivization system to foster entrepreneurial activity. IP-centric regimes are often not in favor and are in conflict with entrepreneurial viewpoints. Licensing back to the inventor can hinder the commercialization aspects as shown by the extensive research of (Hayter, et al., 2018). Moreover, as outlined in the research of Siegel et al., there is the observation that universities with a high number of spin-offs have a clear and focused strategy of knowledge commercialization. (Siegel, 2018)

### 2.3.11 Summary of enablers and blockers in literature

The literature review unveiled already known enablers and blockers for Sciencepreneurship in Austria.

Enablers	Blockers
Knowledge and Technology transfer strategy	Currently implemented project funding policy (public / governmental funding)
Public policy changes	Patent and licensing process
Services offered by Technology Transfer offices	Missing capabilities of Knowledge transfer
Incubation and Acceleration hubs	Currently implemented incentivization and reward system
Entrepreneurial education	Missing risk capital in spin-off financing
Supportive environment (Supportive Universities or research institutions)	Business knowledge gaps
Motivation and Mindset of researchers	
University networks and partnerships	

Table 1: Found enablers and barriers in literature

### 3. Method and logic of research

The main research question to answer in this thesis is:

“What are barriers and enablers for researchers at universities towards the technology transfer via spinoffs in Austria?”

To answer the main research question, an observation of the current state is necessary. Therefore, in-depth interviews with three focus groups have been performed. As methodology the grounded theory was used to approach the phenomenon in a systematic way. The grounded theory comes from social science and is widely used in research. The grounded theory helps building theories based on the methodological gathering of interview data (Yancey & Turner, 1986). The interviewed groups consisted of researchers, TTOs, and spin-offs.

**Researchers** have been chosen as a target group because of their involvement in the invention process at university or research institutions. Due to their research, innovation and prototypes are created. This leads to new knowledge, which ultimately needs to be transferred either to the economy or to other scientists for further research. Researchers have knowledge with the current knowledge transfer procedures, as well as, with the patent and licensing processes at their employer. Researchers are best equipped to answer the research question from their point of view.

**Technology Transfer Offices** are chosen because they are the major player nowadays in regard to knowledge transfer. Since TTOs are dealing with patents, TTOs are crucial in the spin-off process, also. The services offered, such as founders' advice, incubation, funding advice, network, and linkage to the startup community, as well as, help in transforming novel inventions to real business products, are essential for scientists who want to spin off ideas. The services offered are contribute highly to successful or to unsuccessful knowledge transfer.

Last but not least, the viewpoint of the **spin-offs** themselves is important, as well. Who can judge better what is an enabler or a barrier then people who actually are spun off? Therefore, the information obtained by the spin-offs is essential to find real enablers or barriers for Sciencepreneurship in Austria.

The strategy for the qualitative research follows the triangulation of sources. The evaluation of the consistency of different sources is very important and enables cross verification of the obtained data. This is necessary to answer the research question. Moreover, it helps to find the real barriers and enablers for Sciencepreneurship in Austria. (Honorene, 2017)

With the obtained data, a thematic interview analysis was performed. This included following steps based on Clarke:

1. Become familiar with the interview data
2. Assign codes to the data to describe the content. A code is a description of the statement that is relevant according to the research question.
3. Out of the codes, identify patterns. Those patterns need to be labelled with subthemes.
4. Review identified codes and subthemes – iterative refinement
5. Cluster subthemes into enablers and barriers.

(Clarke, 2006)

The shown steps have been performed, based on the grounded theory in an iterative manner (Yancey & Turner, 1986). The interview data was reviewed several times and patterns have been identified. These patterns were labeled and coded. After several iterations groups of codes emerged (Allan, 2003). No special coding software was used. The Analysis of the interview data was performed in Microsoft Excel.

The chosen method can describe what are enabling factors and barriers for Sciencepreneurship in Austria. The method, as well, is able to determine where the observed phenomenon, that great inventions happen in research but not reach the market from which it is coming. Nevertheless, the method cannot describe why the phenomenon occurs. Since the “why” is not part of the research question, this is a factor which can be neglected.

## 4. Results

### 4.1 Interviews and Interviewees

Due to the chosen triangulation approach and due to the fact, the defined groups have a different viewpoint to the same question, three specific questionnaires have been developed. Each one targets the viewpoint of the defined target groups.

Openness and honesty of the interviewees is highly appreciated; therefore, it was consciously decided not to record the interviews. The persons and information related to the person, company, or institution were completely anonymized. The interviews have been performed via phone.

For TTOs following personas have been interviewed:

- **TTO a:** The interviewee is working in a service facility at a university. TTO a is in charge of funding support, administration of the program Horizon 2020 and for training of third parties. TTO a is a very experienced person in knowledge transfer and also in spin-off support.
- **TTO b:** The interviewee is working in a private research facility in Austria. The research facility is not connected to a university. TTO b works as business developer in charge for the whole process from business plan generation until the final commercialization.
- **TTO c:** The interviewee is working in a big Austrian University in the TTO office. TTO c is responsible for patent and licensing management, developing of the knowledge transfer strategy and for industry cooperation's.

The second group which was interviewed was the group of researchers:

- **Researcher a:** This interviewee is working in a private research facility focused on microscopic devices for biological research. The researcher also holds an MBA besides his PhD in physics. The interviewee is an international researcher living in Austria.
- **Researcher b:** The interviewee is working in a research institution in Austria which is not affiliated with a university. Researcher b is specialized in thermal energy systems, head pumps and thermal storages.
- **Researcher c:** This interviewee is a full professor in a Austrian university. Researcher c is specialized in Robotics and Autonomous systems and its implications to society.

As a last group, spin-offs have been interviewed. Following personas participated:

- **Spin-off a:** The interviewee is the COO of a company which provides non-metal materials for 3d printing. The idea was created during the PhD thesis at the university. The interviewee holds a PhD degree.

- Spin-off b: The interviewee is the CEO of a company which provide logistic robotics and multi agent systems. The idea was created at university in a voluntary robotics team. The interviewee holds a PhD degree.

Detailed interview summaries, for each interviewee, can be found in section K of the appendix.

The questionnaire templates used for each group can be found in Section A - Interview Template.

The following results display found barriers and enablers for researcher, technology transfer offices (TTOs) and for spin-offs according to the chosen method described above.

## 4.2 Interview analysis – subthemes and codes

Subtheme	Code
Career	Scientific and other career options
	Career goals
	High risk in jeopardizing scientific career
	Cost of failure for researcher
	Paying high price in terms of career
	Sake of publishing and scientific success measures
	Inflexibility and linear professor career
	Creating knowledge for society
	Education and successful students as career measure
	Number of publications
	Acceptance by scientific community

Table 2: Career pattern and corresponding codes

The subtheme career was mostly named as barrier by the interviewees. *“There is a high chance in jeopardizing your scientific career with a high-risk project which is spun-off”* TTO b



Other statements indicated that companies offer a lot of good positions, as well, which drag potential researchers into the industry. This subtheme also describes the inflexible career model for university employees, so that the cost of failure in a venture would result in destruction of the scientific career.

The next identified subtheme is about entrepreneurial knowledge and education.

Subtheme	Code
<b>Entrepreneurial Education</b>	Entrepreneurial education not existent
	Lack of knowledge how to spin off
	How to fund a venture?
	Poor entrepreneurial knowledge
	Entrepreneurial education and knowledge
	Include in learning plan for students
	Knowledge creation education
	Recognizing commercial value
	Understand the customer
	Training on idea transfer
	Basic education - idea breakfasts
	Networking with experts and startups
	Awareness and education
	MBA education available
	Be able to deal with law and contracting
Market gap found identification	
Free Courses in the internet and at university	

Table 3: Entrepreneurial education and corresponding codes

The statements ranged here from “no knowledge how to spin-off” to “no education is offered for researchers at all.” On the other hand, it was mainly stated by all interviewees that

Entrepreneurial Education is a major and necessary part to enable spin-offs. *“Understanding the customer needs and form a good business plan is crucial for success” Spin-off b*

In addition, it is important to know the necessary tools and the mechanics of how to run a company. How to facilitate growth and how to finance a young company is considered as essential knowledge. Further, the subtheme includes if entrepreneurial education is offered in the respective workplaces of the researchers. The subtheme includes enabling and blocking effects.

Further statements like *“professors support entrepreneurship” TTO c* or *“Understanding / Well seen in the scientific community to spend time on a business idea, that it is not a monumental waste of time” Researcher b* lead to the next identified subtheme and indicates the importance of a supportive environment.

Subtheme	Code
<b>Environment for Scientists</b>	Entrepreneurial University
	Time dedication to run a spin-off
	Resonance with scientific community
	Environment not supportive
	Time restriction for scientists
	Part time scientist

Table 4: Environment for Scientists and corresponding codes

The environment where university employees are working in, was considered mostly as a blocker. For researchers the feedback from the scientific community is very important. Also, the university or research institution need to offer support in having a venture beside being a university employee, which is not always the case. Moreover, there is no possibility at the moment to be a part time researcher.

Statements like *“... there is no monetary benefit for researchers to work on a patent and spin-off” TTO b* or *“If you don’t acquire projects and money, you get fired” Researcher a* and the ambivalent picture of a researcher vs. an entrepreneur led to the next identified subtheme called Incentivization and role as a scientist.

Subtheme	Code
<b>Incentivization and role as a scientist</b>	Better workplace offers
	No Entrepreneurship support
	No monetary benefit for researcher
	Losing people and income - management
	Scientists need to find new project
	No incentivization for patents
	Researcher vs Entrepreneur
	Flexible time allocation
	Success as scientist
	Working on many different topics
	Responsibility
	Customer Focus missing
	Positive role Models needed
	Incentivization System
	Part time professorship
	Be dependent appears not very attractive
Hybrid job	
Time restriction for Professors	
Agencies and Mediators	

Table 5: Incentivization and role as a scientist and corresponding codes

The subtheme incentivization and role as a scientist includes e.g. the success measures for scientists which are currently not fostering entrepreneurship. Additionally, the subtheme outlines the time restrictions and the responsibilities which university employees have. The subtheme also includes the topic of incentivization for patents which are filed by the researcher. All this topics lead to the fact that it was mostly seen as blocker by the interviewees.

Incubation, Acceleration, and Services were named by all interviewees as crucial factors on the enabler side as well as on the barrier side. Reaching from services which are offered or not offered the answers show how important good service is for researchers and spin-offs. Statements like *“no there is no TTO support at all at my institution”* Researcher b or *“There is a micro fund available to develop prototypes but it’s simply not enough ...”* TTO c underline this importance.

Subtheme	Code
<b>Incubation, Acceleration and Services</b>	Micro fund available but tight budget
	No TTO Office
	How spinning-off works unclear
	Unclear what steps to take
	No spin-offs as example available
	Support in company creation
	Selection right funding difficult
	Funding landscape
	No incubator or accelerator
	Service
	Talent Management & Recruiting
	Patents and Licensing assistance
	Industry cooperation
	Startup fair organization
	Funding advisory and support
	Business developers in competence units
	Funding possibility available
Business developer with impulses	
Funding opportunity to breach gap	
Knowledge transfer strategy	

	Industry cooperation facilitation
	Spin-off support and encouragement
	Contract and law support
	Patent and license management
	Marketing and International support
	TTO would be helpful
	Funding landscape
	Assistance in describing the market
	TTO helps in exploiting the result
	Marketing and customer feedback
	Supervision in business plan dev.
	Mentoring
	FFG funding possibilities
	Entrepreneurial support
	Funding landscape guidance
	Accelerator / Incubator
	Feedback integration

Table 6: Incubation, Acceleration and Services and corresponding codes

Incubation, Acceleration and Services was mostly named as enabler by the interviewees. The subtheme consists of various services offered by e.g. TTO offices, which are essential for founders. The topics range from mentoring, funding advisory, supervision and business plan development towards assistance in finding a market for a product. Nevertheless, this subtheme also hinders researchers in founding a spin-off if they are not existing. The interviews showed that it is essential for successful spin-off procedures to have as many of these services close to the research facility.

*“Knowledge and know how” Spin-off a* and *“we took over IP but realized how important it is to create own IP very soon” Spin-off b* outlines the importance of universities to form

“*knowledge for society*” *Researcher c*. Statements like this are clustered in the subtheme IP and patent management, which is a crucial factor for knowledge transfer in spin-offs.

Subtheme	Code
<b>IP and Patent Process</b>	IP necessary
	Lean process of patenting
	Published too early
	Patent quality is poor
	Duty inventions
	Patents granted
	Patent process takes long
	No motivation to patent
	Big effort for small gain
	Depends on person priorities and time
	Lack of knowledge in patenting process
	Patent and Licensing process beneficial
	IP rights distribution
	Old and not lean
	Approval process
	Patent attorney
	Hard to do it differently
	No equity for University
IP transfer	
Generate own IP	
Semiprofessional experience	

Table 7: IP and Patent Process and corresponding codes

Mostly the IP and Patent process was named as blocking. The process takes some time and requires involvement from the researcher. This takes more time away from the researcher and prevents him from research tasks. Moreover, the IP and Patent transfer to spin-offs requires agreements with all parties which is sometimes very difficult, especially if there are more parties involved.

Named also by many interviewees, the next identified subtheme is dealing with entrepreneurial mindset and own motivation. *“Mindset of universities in Europe are different to USA, cultural issue”* Researcher a and *“Ability and willingness to work hard and to stay at one topic for many years ...”* Spin-off a describe how enabling or blocking mindset can be.

Subtheme	Code
<b>Mindset and Motivation</b>	Security and stability
	Personal motivation of scientists
	Mindset and behavior
	Expectations
	Thinking often about it
	Acceptance by user
	Cool and sexy in USA not in Europe
	Mindset and entrepreneurial knowledge
	Continuous development and improvement
	Fast learning
	Being ready for it
	Mindset to invest everything
	Learning by doing
	Ready to invest a lot
Own interest	

Table 8: Mindset and Motivation and corresponding codes

This subtheme includes the dimension of mindset and motivation of researchers to go into the direction of spin-offs. This was seen as blocking most of the time, since there is no incentivization in place at the moment. Nevertheless, there were components named which are needed to successfully spin-off. These positive components can be seen as enabler if a researcher has them.

Cooperation's and partners are always important for spin-offs. But it can be also tricky to spin-off with industry or university partners. The following statements show an ambivalent view on the subtheme Partnerships and Cooperation's.

*"... founding with a professor together as partner ..."* Spin-off a

*"... combination out of experience and fresh blood fueled growth ..."* Spin-off a

*"... in industry cooperation's the IP usually is held by the University and the industry partner – this makes it harder to spin-off ..."* Researcher a

*"... the research institution / university should not be the workbench for the industry ..."* Researcher c

Subtheme	Code
<b>Partnerships and Cooperations</b>	Promised IP to industry partners
	IP not for free
	Industry likes cooperation with university
	Competitive advantage
	Network of partners
	Industry cooperation
	Matching Process difficult
	Technology Scouts
	Who holds the IP?
	Super hard partnerships
How to price the IP	



	Independence of economic interest
	Not mutual exclusive
	knowledge need to be publicly available
	With a partner
	Strategic investor
	Loose linkage to university
	Diverse team
	Relationship with University hard in the beginning
	After a while support of University increased
	Super founding team

Table 9: Partnerships and Cooperations with corresponding codes

The subthemes partnerships and cooperations deals mostly with industry partnerships but also with relevant networks for spin-offs. The relationships and networks which the parent facility can provide is important for young firms. It also includes the topic of founding partners. As shown by the interviews, having the right founding partners is crucial for success. Moreover, the subtheme covers the relationship between the spin-off and the parent facility.

At universities, prototypes are usually developed. These prototypes are not ready for the market. Prototype development is therefore the next identified subtheme.

“... create a setting where the pressure for developing the prototype to a product is not too high ... “Spin off a and “There is a financial gap to develop prototypes further to products”. TTO b outline some thoughts to this category.

Subtheme	Code
<b>Product development</b>	Prototype development support
	Financial gap in prototype development
	Own money for breaching gap

	TTO happy to support in prototype development
	True cost overview important

Table 10: Product development and corresponding codes

The product development subtheme deals with the development from prototype to a marketable product. It was named mostly as blocker because the funding is very limited. Nevertheless, it is very important for a spin-off to develop a prototype further in a sustainable way. Interestingly, the interviewees of the spin-offs and the TTOs outlined in the interview another subtheme, which is called Resources and Infrastructure which is closely related to this subtheme. Statements like *“No incubator or accelerator is available ... “TTO b* or *“We needed to rent offices at the University for too high prices ... “Spin-off a*, underline this point.

Subtheme	Code
<b>Resources and infrastructure</b>	Startup Landscape
	Accelerator / Incubator
	No money for further development
	Resources
	Capital intensity of Invention
	To high rent at university
	Infrastructure

Table 11: Resources and Infrastructure with corresponding codes

The subtheme resource and infrastructure were named as barrier due to the fact that not always suitable infrastructure is available. Here the interviewees referred to the fact that sustainable growth is only possible if facilities are available to a reasonable price. This depends also strongly on the region where the spin-off is founded.

University knowledge transfer strategy contains key enabling factors but as well, on the other hand, key blocking factors according to the interviews. Different ways of commercialization strategies and patent strategies can block or enable spin-offs. Therefore, the last category identified deals exactly with this part of the interviewees answers.

Subtheme	Code
<b>University and Knowledge transfer Strategy</b>	Entrepreneurial University
	Commercialization
	University knowledge transfer strategy
	Yearly Spin-offs
	Yearly Startups
	Feedback integration
	Start research project where a clear market can be defined
	Research based organization
	Shift to customer based
	Market relevant projects
	Started to think about licensing and products
	Openness
	Support from university
	Building trust
	Fairness
	Adaptation to new trends
	Basic research & society
	Close knowledge gaps with science
	All money needs to be invested
	Support in internal processes
Idea of commercialization in mind	
Exclusiveness and support of academia	
Knowledge transfer to society	
Semiprofessional support	

Table 12: University and knowledge transfer strategy and corresponding codes

The subtheme university and knowledge transfer strategy combine the factors which are necessary for a commercialization strategy at research facilities. Very important for the interviewees was as well that the universities become more entrepreneurial.

### 4.3 Barriers and Enablers from TTO's perspective

Combining now the interview data with the identified subthemes, there are the following enablers and barriers for Technology Transfer Offices:

Barriers	TTO a	TTO b	TTO c
Career	X		
Mindset and motivation	X	X	
Product development		X	X
Entrepreneurial education		X	
University and Knowledge transfer strategy		X	
Incentivization and role as a scientist	X	X	X
IP and Patent process	X	X	X
Resources and Infrastructure		X	X
Partnerships and cooperations	X		X
Incubation, acceleration and services			X

Table 13: All barriers named by the interviewed TTO's

The next table shows the enablers named by the same interviewees. Due to the fact that many of the subthemes have blocking elements as well as enabling elements the table might show the same themes but highlights the enabling aspect – hence the distribution is different.

<b>Enablers</b>	<b>TTO a</b>	<b>TTO b</b>	<b>TTO c</b>
Entrepreneurial education	X		
Environment for Scientists	X	X	
Mindset and motivation		X	X
Product development	X		X
University and Knowledge Transfer Strategy	X	X	X
Incubation, Acceleration and Services	X	X	X
IP and Patent Process	X	X	X
Resources and Infrastructure	X		X
Partnerships and Cooperations	X	X	X

Table 14: All enablers named by the interviewed TTO's

The following graph shows the distribution frequency of the named barriers and enablers by the TTOs:

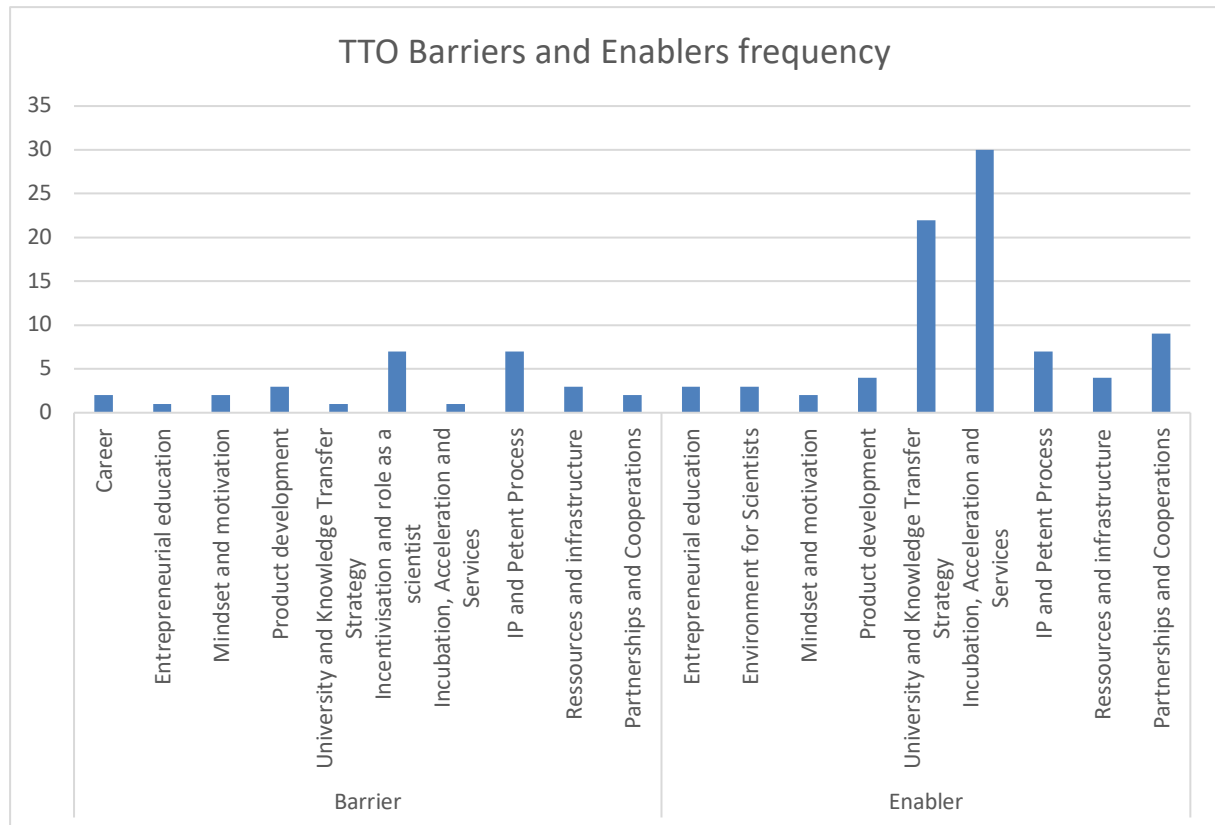


Figure 1: Barriers and Enablers frequency by the interviewed TTOs

#### 4.4 Barriers and Enablers from Researchers perspective

Combining now the interview data with the identified subthemes, there are following enablers and barriers for researchers:

Barriers	Researcher a	Researcher b	Researcher c
Career	X	X	X
Environment for Scientists	X		
Mindset and motivation			X
Entrepreneurial education	X	X	
Incubation, Acceleration and Services	X	X	
Incentivization and role as a scientist	X	X	X

IP and Patent Process	X	X	
University and Knowledge Transfer strategy	X	X	X
Resources and Infrastructure		X	
Partnerships and Cooperations	X	X	X

Table 15: All barriers named by the interviewed Researchers

The next table shows the enablers named by same interviewees. Due to the fact that many of the subthemes have blocking elements as well as enabling elements the table might show the same themes but highlights enabling aspects – hence the distribution is different.

Enablers	Researcher a	Researcher b	Researcher c
Career			X
Entrepreneurial education	X	X	X
Environment for Scientists	X		
Mindset and motivation	X	X	X
Incubation, Acceleration and Services	X	X	X
Incentivization and role as a scientist	X		X
University and Knowledge Transfer strategy	X	X	X
Partnerships and Cooperations	X		X

Table 16: All enablers named by the interviewed Researchers

The following graph shows the distribution frequency of the named barriers and enablers by the researchers:

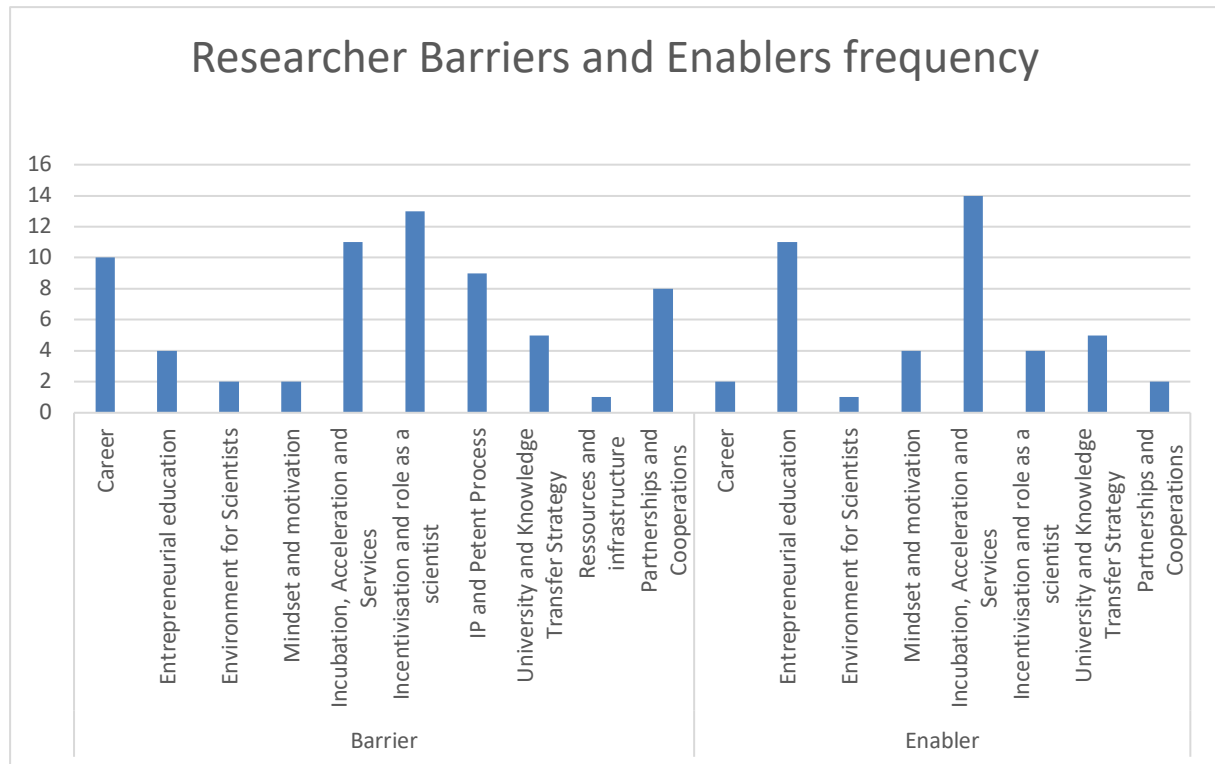


Figure 2: Barriers and enablers frequency by the interviewed researchers

#### 4.5 Barriers and Enablers from Spin-offs perspective

Combining now the interview data with the identified subthemes there are following enablers and barriers for spin-offs:

Barriers	Spin-off a	Spin-off b
Product development	X	
Partnerships and cooperations		X
IP and Patent Transfer		X
University and Knowledge Transfer Strategy	X	X
Resources and Infrastructure	X	
Environment for Scientists		X
Career		X



Incubation, Acceleration and Services	X	X
Entrepreneurial education		X

Table 17: All barriers named by the interviewed Spin-offs

The next table shows the enablers named by same interviewees. Due to the fact that many of the subthemes have blocking elements as well as enabling elements the table might show the same themes but highlights enabling aspects – hence the distribution is different.

Enablers	Spin-off a	Spin-off b
Entrepreneurial education	X	X
Mindset and motivation	X	X
Product development	X	
Partnerships and cooperations	X	X
Incubation, Acceleration and Services		X
Environment for Scientists		X

Table 18: All enablers named by the interviewed Spin-offs

The following graph shows the distribution frequency of the named barriers and enablers by the spin-offs:

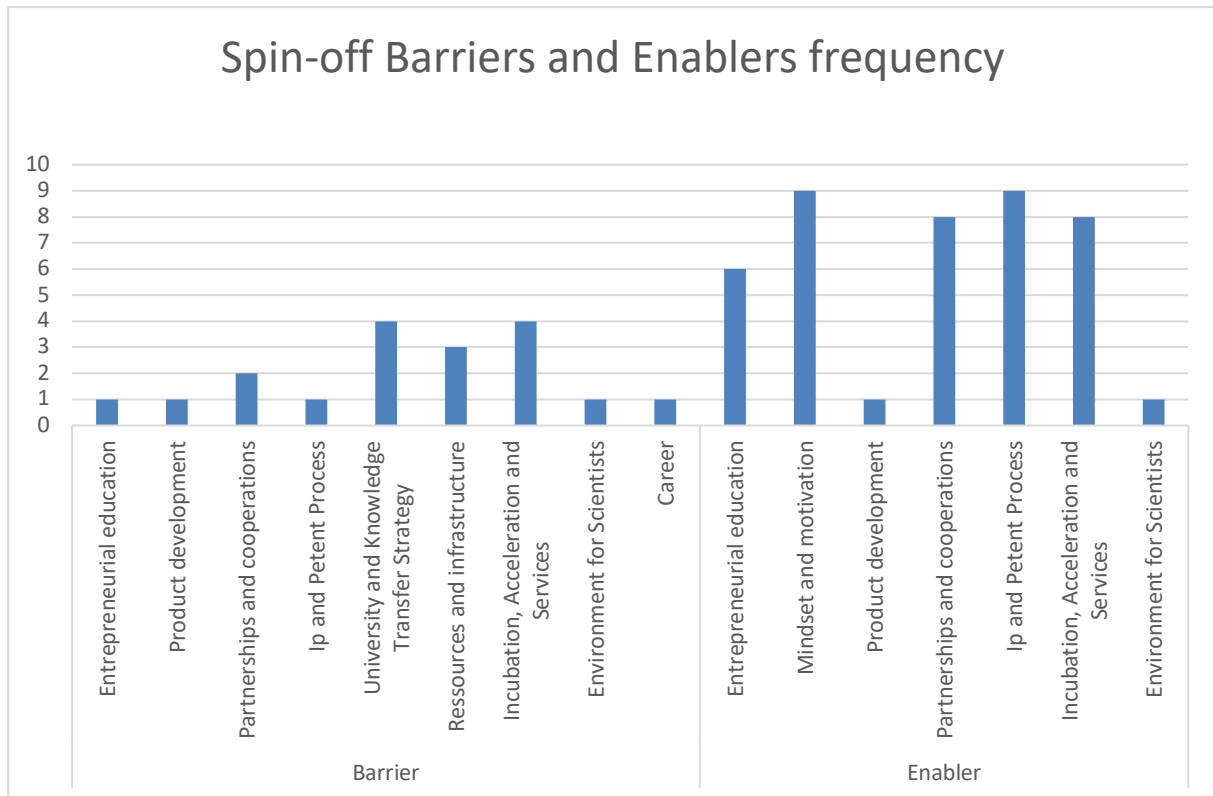


Figure 3: Barriers and enablers frequency by the interviewed spin-offs

## 4.6 Similarities / Dissimilarities

If we look over all the interviews for common barriers and enablers, we get following distribution:

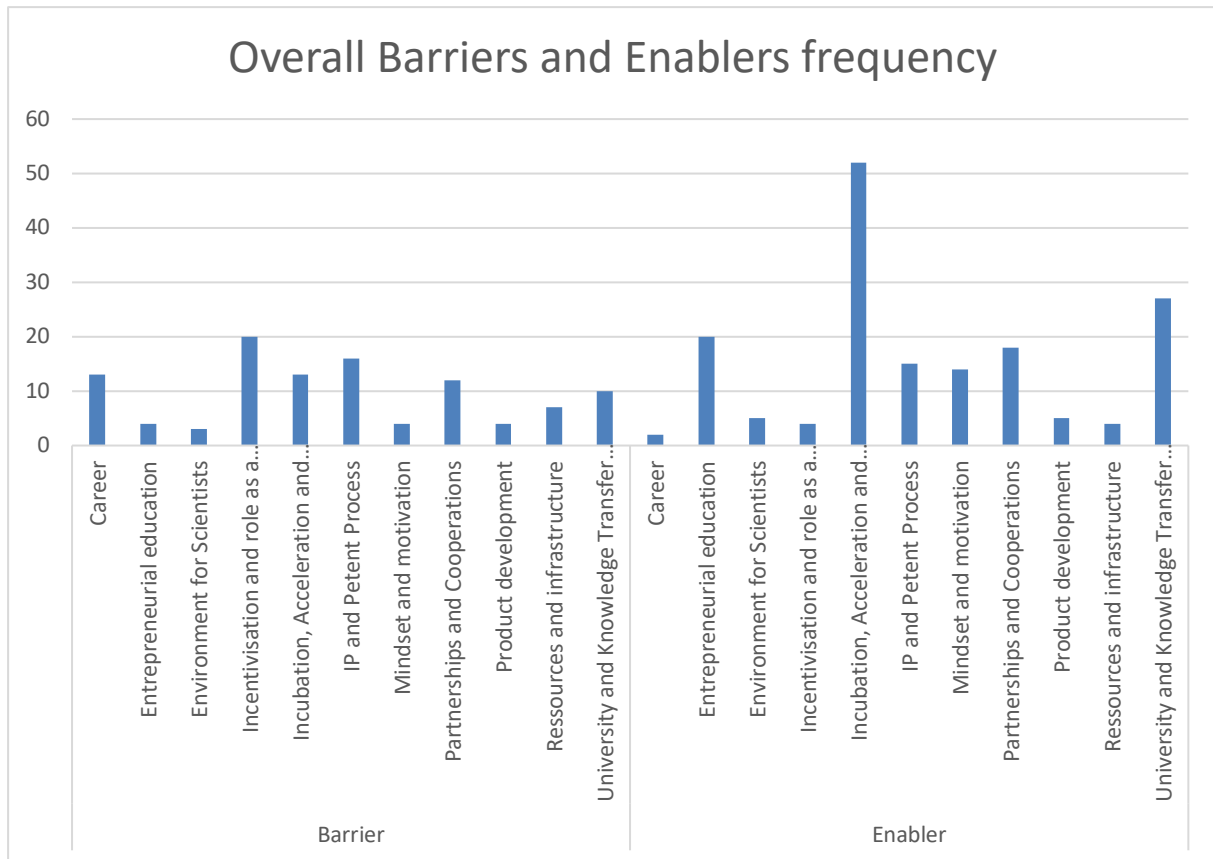


Figure 4: Barriers and enablers frequency named by all interviewees across the three groups

## 5. Interpretation and discussion

As stated in the Introduction, the main goal of this thesis is to answer the question:

“What are barriers and enablers for researchers at universities towards the technology transfer via spinoffs in Austria?”

### 5.1 Barriers

As shown in the result section one barrier is that Incubation, acceleration and other services are not always available in the respective institutions. There are no best practices available to orient on. As *Researcher a* said in the interview: “*We don’t have anyone in house to guide it in that sense even if there is commercial value.*” For many researchers, it is unclear how-to spin-off and how it actually works. Guidelines and rules are missing, in many cases. This is also strongly connected to mindset and motivation. The more best practices are available and the more

successful spin-offs are formed, the higher is the motivation of the researchers to go onto the entrepreneurial path.

Another strong barrier is the career definition of researchers in Austria. There is a strong linear career for professors or researchers, at the moment. People work hard and long to achieve this position. As *Researcher b* outline in the interview: “*Successful scientists are willing to pay high personal cost in order to achieve scientific results that would ensure further funding to move forward in the scientific career – this is documented in publications.*” Forming a spinoff has a high potential to jeopardize this career achievement since it is not very well perceived in the scientific community. Currently, there is a sake of publishing which is the greatest scientific success measure. Therefore, there is a time restriction for academics to consider spin-offs, in addition to regular activities. The system emphasizes that academics need to generate new projects and apply for new funding after a project’s end.

*TTO b “If you don’t acquire projects and money you don’t get fired”*

This confirms strongly the findings of Siegel et al. which said that there is a cultural barrier between universities and the newly established firms. He also outlined the insufficient support and incentivization system. (Siegel, 2018) Additionally, the interviews show that there is a big inflexibility in the current academic career. At the moment, there is no part-time professor or part-time researcher position in Austria as outlined by *Researcher c*: “*Part time possibility would also help – mindset shift with awareness would be beneficial*”. This statement confirms the results of Jain et al, which outlined already that a transition to a hybrid role of the researcher would be beneficial. (Jain, et al., 2009) The career barrier is strongly related as well to the barrier of incentivization and role as a scientist as well as to the barrier of environment for scientists. The environment barrier for scientists confirms Hayter et al. findings that general culture and environment is very important for spin-offs, (Hayter, et al., 2018) (Klofsten & Jones-Evans, 2000) (Marzocchi, et al., 2017). All the researchers in the interviews agreed that publications only should not be used as success measures. Additionally, it was mentioned in the interviews that having a spin-off and being a researcher at the same time increases the responsibility the researcher takes on dramatically. This higher assumed responsibility should be also awarded. The target setting for incentivization of scientists need to be adapted to foster more spin-off creation. *Researcher c* mentioned very interestingly that “... *success measured in how many students have founded companies can add a different viewpoint, flexibility for*

*private industry and academia...*” As well, we need to consider that the industry offers security and other job opportunities for researchers. Therefore, the risk must be equally weighted between advantages and disadvantages of spinning off. Part of the incentivization schemes should be as well the incentivization for patents. As TTO b outlined in the interview “*In working contracts there is a fixed share for single person (inventor) that he gets -> it’s a small share, very little motivation financially*”.

This confirms the research findings of Hayter et al. said that policy makers need to find other incentivization systems for researchers who go the entrepreneurial path. (Hayter, et al., 2018) On the other hand, Spin-off a outlined how important it is to have IP in the company and how important it is to create additional IP as a spin-off. The IP and patent processes have been also identified as a barrier. The research also shows that in some institutions, there is no support for patenting or even a TTO office that does patent and license management.

As the TTO b outlined “... *Researcher on their own need to consult a patent attorney to file a patent.... there is no further support from TTO (Business Developer)...*”

The patent process appears to take long from the researcher’s point of view. The TTOs outlined that “*Hard to structure it differently – process is driven by patent offices – must go to an attorney anyway*”, TTO a. Nevertheless, other barriers for the patent and licensing process have been named. The problem is awareness and mindset of researchers. The speed of the process depends strongly on the patent process knowledge of the researcher. Another problem sometimes are too early publications of the respective work, which lead to the problem that the patent cannot be filed. Hayter et al. outlined in his research as well that IP-centric regimes are often not in favor of the entrepreneurial viewpoint. Licensing back IP to an inventor is problematic and can hinder various commercialization aspects. (Hayter, et al., 2018)

Connecting to the barrier Mindset and Motivation, the expectation of the researchers is sometimes very different than the reality. Additionally, having a spin-off in Austria is not perceived as sexy as *Researcher c* outlined.

“...*having startup is not so cool as in USA, awareness that this could be an option, you could still work at a university*” *Researcher c*.

This connects very well to the barrier partners and industry cooperation. As discussed before, there isn't always someone who manages patents and licenses. TTO b outlined that his institution has now started thinking about licensing. TTO c outlined that “...*There is a difficult matching process – University has technologies and look for companies, but also companies have scouts who look for technology.*” It is sometimes difficult to license an IP held by an industry partner of the university. Researcher c outlined an ambivalent view as well on industry partnerships with a strong focus on independent science and not being the workbench of the industry. This is linked to the research of Siegel et al., which found that many researchers bind their patents to their industry partners. (Siegel, 2018)

Since there are many ways of commercialization, this is related to the University and Knowledge Transfer Strategy, which was identified as well as major barrier. As Researcher c outlined “*Academic habitus is against it, exclusiveness of academia, and superior thinking hinder researchers ...*” University support and a clear strategy are both very important to enable researchers. The interviewees mentioned that there is only “*Semi – optimal support from the universities*” *Spin-off a*. Another related problem identified is that university structures are not set up currently for spin-off facilitation. The knowledge transfer strategy is then deeply connected to the barrier Incubation, Acceleration and Services. TTOs that are easily accessible and where support is bundled are crucial. There is evidence in the data that shows that support in the funding landscape and deciding on the right funding in the beginning is essential for successful spin-offs. Surprisingly, the networks of accelerators and incubators that now exist in Austria were not mentioned by the interviewees. This led to the question of why nobody knows about these networks. (Science Park Graz GmbH, 2018) (ABA, 2018) (APLUSB, 2018) (FFG, 2018) (INITS, 2018)

Researcher a “*What is the best company structure? What is the process we need to work on? What steps do we need to take?*”

As barrier identified was Entrepreneurial Knowledge of scientists. This was considered very basic, as shown by the interview data. Many scientists have little entrepreneurial knowledge, or they learn it by doing. The data shows, however, that entrepreneurial knowledge is a crucial factor and barrier for spin-offs. This confirms the results from Siegel, which said business knowledge is needed for spin-offs and for TTO employees to successfully work together. (Siegel, 2018). It is very hard to spin-off without entrepreneurial knowledge and experience.

Moreover, Hayter et al, and Hahn et al. show that it is very important and beneficial for universities to offer entrepreneurial education to their employees and students. (Hayter, et al., 2018) (Hanh, 2019)

*“Didn’t know any funding possibility especially for the venture options. Scientific funding yes but not for ventures.” Researcher b*

This goes hand-in-hand with two additional barriers: Resources and Infrastructure and Product development. The product development out of a prototype is very capital- and time-intensive. The inventor should somehow be part of product development to ensure proper progress. This refers to the findings of Franzoni & Lissoni, which stated that companies who have the finances but license the IPR<sup>8</sup> have problems in developing prototypes within their own power due to the needed relationship to the inventor. (Franzoni & Lissoni, 2006). There is a funding gap in prototype/product development, as outlined by TTO c and Researcher a. TTO c said in the interview *“There is a small fund available for prototype / product development but it’s simply not enough”*. In terms of infrastructure, it is very hard for spin-offs; if there are no support or Incubation/Acceleration, it is very difficult as outlined by *Spin-off a “... we rented for 10 months offices at the university to a not market value price ...”* Additionally, it was mentioned in the interview that it is difficult for spin-offs to find places to sustainable grow as a company.

Compared with the literature research following findings can be summarized:

Literature Barriers	Compared to this study
Currently implemented project funding policy (public / governmental funding)	The study has found no evidence that this is a barrier in Austria.
Patent and licensing process	The results of this study confirm the literature that the “patent and licensing process” is seen as barrier for Sciencepreneurship.
Missing capabilities of Knowledge transfer	The barrier from the literature is confirmed by this study. The interviews showed that not every institution has capabilities of

<sup>8</sup> Intellectual property rights

	knowledge transfer. The interviewees considered this as a major factor which hinder spin-off creation.
Currently implemented incentivization and reward system	The barrier of the incentivization and reward system was also a major barrier found in this study. Therefore, the barrier is confirmed.
Missing risk capital in spin-off financing	This barrier is as well confirmed by this study. Financing options are available but not in terms of risk capital as the interviewees outlined.
Business knowledge gaps	This barrier is confirmed by the Entrepreneurial education barrier identified in this study.

Table 19: Overview of barriers discovered in literature compared to the barriers discovered in this study

Additionally, following barriers were found which were not discovered in the literature review:

<b>Additional Barriers</b>	<b>Compared to this study</b>
Career	The identified barrier of the scientific career definitely enriches the existing literature. The inflexible career paths and the potential harm for the career, by creating a spin-off, was identified as barrier.
Environment for scientists	This barrier enriches the literature as well and shows how blocking it is to have no support from the parent institution. Additionally, the support from the scientific community is very important. If this support factors are not given it hinders successful spin-off creation.



Product development	This barrier was named by the interviewees and shows a huge funding gap in the area of prototype development. The existing literature has not drawn big attention to this topic.
Partnerships and cooperations	This barrier outlines the importance of partnerships with the parent facility. If the partnership is complicated it limits the researcher. Additionally, it highlights the importance of the right founding partners. This identified barrier in this study enriches the existing literature by the aspect of founding partners.
University and Knowledge transfer strategy	This barrier targets the big picture and all processes which are defined at the university related to knowledge transfer. The literature gets enriched by the aspects which are necessary to successfully foster spin-off creation.

Table 20: Barriers which add new insights to existing literature

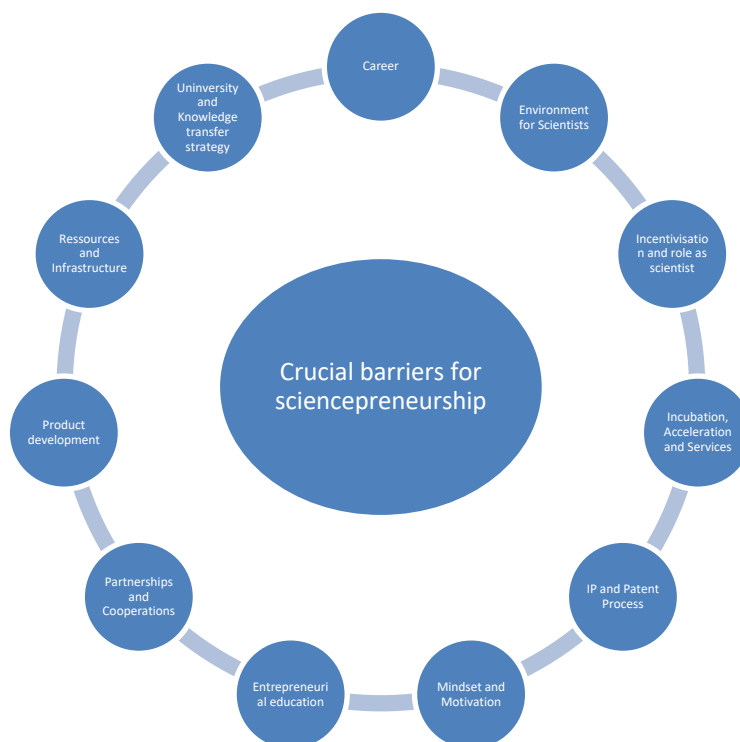


Figure 5: Crucial barriers for Sciencepreneurship in Austria

## 5.2 Enablers

First and foremost, the interviewees across all groups identified as enabler the University and Knowledge transfer strategy. As it can be perceived as a barrier as well, support from the university or research institution is very important. This confirms the observations of Siegel et al., which found that universities with a clear and focused strategy can produce more spin-offs. (Siegel, 2018) This strategy specifies the terms and practices of the commercialization. This ranges from the definition of the “*Entrepreneurial University...*” as TTO a outlined, till working together on spin-offs and support researchers in their journey. Important for the interviewees as well was that trust is built between the researchers and institutions. The strategy outlines additionally how the funding is allocated and how the scientists are incentivized. Incentivization and the role of a scientist was identified as enabler based on the obtained data. Flexible working schemes that enable researchers to pursue a spin-off while still working as a researcher were valued very highly. Different incentivization schemes were discussed in the interviews. This ranged from incentivization for patenting to measurement of successful students. The incentivization and the role of a scientist need to be regulated by the policy makers but also need to be included into the university and knowledge transfer strategy. This can lead then to a very different career understanding for researchers. This confirms again the research results

from Hayter et al. who said that the role of a researcher needs to be going into a hybrid one. Additionally, it confirms the understanding in the scientific world that policy makers need to adapt the incentivization schemes to foster higher spin-off generation. (Hayter, et al., 2018) Then career would be considered as well as an enabler if it would be flexible and not only bound to publications and teaching.

Changes in these strategies shift the emphasis towards more customer focus. This shift is also outlined by TTO b *“Historically we are organized like a research-based organization – now during last strategic period we strongly committed on customer projects and on customer focus”*.

Some universities already have a positive track record in spin-offs and a constant flow of 1 - 4 spin-offs a year, as can be seen by the startup and spin-off map of the TU Graz, (TU Graz, 2019). The strategy should also regulate how the patent and license strategy influences the commercialization of inventions. Furthermore, the universities would start to listen more and more to customers and consumers in the market.

*“Feedback is relevant for strategic agenda for whole research center... Assuring that the company is visible in market segments.” TTO b.*

The strategy also includes which Incubation, Acceleration and Services are offered by the TTO, or even if there is a central TTO. These services were named as major enabler by all interviewees. This confirms again the findings of Hayter et al. and Hahn et al., that incubators built near campuses and strong TTOs can boost entrepreneurial activity. (Hayter, et al., 2018) (Hanh, 2019) The services offered have a wide range of funding support, from the organization of startup fairs and funding advisory to bridging the funding gap in prototype development. Talent Management for the industry can also be part of such services as TTO as outlined in the interview. Therefore, Resources and Infrastructure available are also an enabler. The interviews provide evidence and confirm the founded enabling factors in the literature (INITS, 2018) (TU Graz, 2018) (TU Graz, 2019) (Wirtschaftskammer Österreich, 2018).

TTO b *“...TTO is there to help describing the market and help researchers to identify commercial value...”*

TTOs usually have the best overview about possible incubation and acceleration networks. Either it is provided on campus directly or via networks of different providers. Additionally, TTOs have a great overview about funding possibility to bridge the gap between prototype and product development. Services offered can really enable spin-off creation by building trust and a good relationship to researchers and the university. TTOs for example help in patent and license management. This confirms the findings in the literature by Siegel et al., who outlined in his research findings the importance of strong TTOs, (Siegel, 2018).

*“Support in taking over patents was really good and fair” Spin-off a*

Awareness building, in terms of patenting and publications of scientific work, is offered and considered very important, too. This leads to the next enabler called Motivation and Mindset. According to the interviews, it’s the researcher who thinks often about spinning-off research inventions, but the data show evidence that the mindset and motivation of the researcher are crucial for successful spin-offs. *“Always depends on the personal motivation of the engineers / scientists.” TTO b*

*Spin-off a* outlined as well *“...that it strongly depends on the willingness to invest a lot and work hard...”*

Learning by doing is also a major part of mastering the entrepreneurial activities, as shown by the barriers named in the barriers section. This can only be achieved with the right mindset and motivation. To avoid too much learning by doing, Entrepreneurial education on all levels is considered as an enabler, too. There is a strong commitment from the strategists and TTOs responsible to bring more entrepreneurial education in teaching plans. This would foster future spin-off creation and contribute significantly to the mindset and motivation enabler found. As *Researcher a* outline in his interview *“Hardest part is recognizing the commercial value – this is a main enabler to spin off ...”* it is very important to teach such methods as early as possible. *Spin-off a* additionally outlined the importance of understanding the law related to contract building and negotiation. This confirms again the research findings from Siegel et al. which emphasized the importance of entrepreneurial understanding of researchers. (Siegel, 2018) Entrepreneurial education also fosters the entrepreneurial environment at a university or research institutions. Further, the interviews showed most professors already now support the entrepreneurship activities of their staff. This knowledge helps the researcher to develop

business plans and identify potential business models. But before a spin-off launches a product, the product development needs to be started. Product development was also a major data cluster in the interviews and is considered as an enabler. Support of the university or institution in the prototype and product development is very important according to Spin-off a. The funding options available need to be explored with the help of the TTO and the researcher. At the moment, there is not so much funding available that bridges this gap, but it can be considered definitely as an enabler if funding would be available. This correlates with the research findings of Hayter et al. who already found that in Austria, there is a gap in funding and risk capital. (Hayter, et al., 2018)

Another major enabler that was identified deals with Partnerships and cooperation. Here it was outlined that it is important for the industry that contracts and best practices are available. Many universities and research institutions are going into the direction of third-party project financing. This means they work closely together with industry partners on specific problems. *TTO a* outlined in the interview “... *the cooperation with the University is highly valued by the respective industry partners ... service and knowledge is a boost for them and for science ...*”

The knowledge gained in this cooperation usually belongs to the industry partners, which might get a competitive advantage. The research itself needs to be publicly available as a foundation principle in science. *TTO b* outlined “*Close cooperation with clients to find additional fields of research. Very market oriented already in the beginning.*” The data clearly shows that this strategy assistance helps transition towards a more customer-oriented view.

The interviews showed evidence that not only cooperation with the industry are important for spin-offs. Strong founding partners, which can be professors or even strategic investors as partners, are very important as stated by Spin-off a. Partners and cooperation also regulate and influence the spin-off relationship with the respective parent institution.

*Spin-off a* “*We basically had no coupling in the beginning. For us it was very important to have cost truth, and this was only possible if we were independent. Nevertheless, it was very important for us to have a Professor as founding partner. I had most of the work, but he had strong ties to the University. After two years we did the first project together. This was because it was thematically fitting not because we were related ...*”

Last but not least, the IP and Patent process was identified as a clear enabler for spin-offs. *TTO a* said in the interview “*A major enabler for spin-offs is knowhow and a clear IP which secures at the beginning a competitive advantage.*” The sentence also shows how important it is to cooperate and to be fair in the takeover negotiations. Therefore, it has to be clearly part of the university and knowledge transfer strategy. TTOs also tried in recent years to redesign the patent process to make it leaner. This, of course, boosts the whole patenting process. Deadlines set by the regulator cannot be changed, but TTOs tried to build awareness within the research community to increase the quality of the patent applications so that the process gets better overall.

*Spin-off b* outlined “*We took over IP and the cooperation with the University was great – nevertheless we realized quite soon that we need to create own IP for the company...*”

Compared with the literature research following findings can be summarized:

Literature Enablers	Compared to this study
Knowledge and Technology transfer strategy	This study confirms the enabling elements of the knowledge transfer strategy. If a University and Knowledge transfer strategy fosters entrepreneurship it definitely encourages researchers to spin-off.
Possible public policy changes	This study outlines barriers and enablers which can be used by policy makers to adapt and change current policies.
Services offered by Technology Transfer offices	This study confirms that the support provided by the TTOs is very enabling and required.
Incubation and Acceleration hubs	This study outlines the importance of incubation and acceleration spaces. Therefore, this study confirms this enabler from the literature.
Entrepreneurial education	This study confirms the importance of entrepreneurial education as well.

	Entrepreneurs simply need to know how to run a company. The literature gets enriched as well by the fact that it is very enabling if the research facility offers entrepreneurial education as service.
Supportive environment (Supportive Universities or research institutions)	This study confirms the found enabler in literature that a supportive environment is key for spin-off creation.
Motivation and Mindset of researchers	This study also confirms this enabler regarding the mindset and motivation of researchers.
University Networks and partnerships	This study also confirms that partnerships and networks are very important. Nevertheless, the literature get enriched by the aspect of founding partners and also investors as partners.

Table 21: Overview of barriers discovered in literature compared to the enablers discovered in this study

Additionally, following enablers were found which were not discovered in the literature review:

Additional Barriers	Compared to this study
Product development	The study showed that if there are facilities or services which help in the development of products, that this is a powerful enabler. Especially funding and prototype facilities can foster more products reaching the market.
Resources and Infrastructure	The study outlined an interesting fact as well that not much facilities are available in Austria for sustainable growth of spin-offs.

Incentivization and role as a scientist	The study enriches the literature in the field of the hybrid role of a scientist. It enriches the literature with other success measures like successful spin-offs founded by students of the researcher. This would encourage and change the spin-off motivation drastically.
---	--

Table 22: Enablers which add new insights to existing literature

Summarized in Figure 12, all crucial enablers for Sciencepreneurship in Austria can be found.

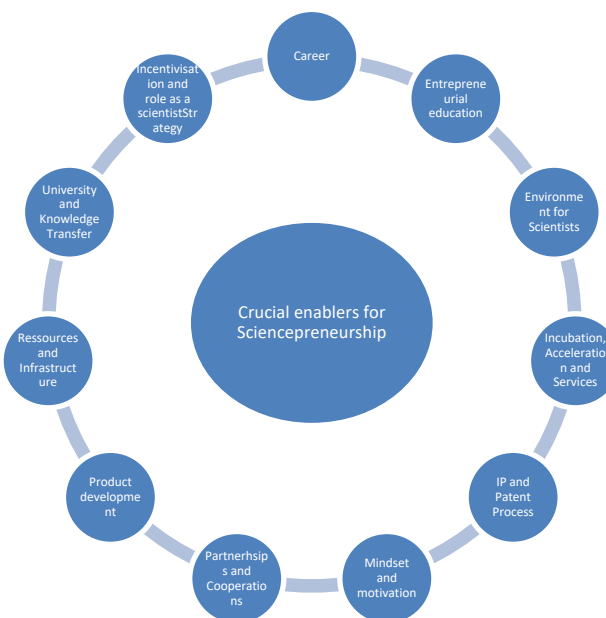


Figure 6: Crucial enablers for Sciencepreneurship in Austria

### 5.3 Contribution to further research

As in this thesis, the question about enablers and blockers of Sciencepreneurship in Austria was answered, there will be more research needed in order to completely understand and explain the identified phenomenon.

The reader can learn about the different aspects of the identified subthemes which are clustered in barriers and enablers. The subthemes sometimes cover barriers and enablers at the same time. If the reader looks deeper, he will learn that it always depends if the services or processes are in place. If we look deeper in the found enabler of the university a knowledge transfer strategy, deeper research would be needed to identify better strategies to foster Sciencepreneurship.



Additionally, the question towards policy adaptations can be raised. How do the policies need to be changed to enable researchers to go this career path? In addition, the incentivization schemes and time restrictions need to be adapted. How should the incentivization schemes be adjusted? To answer this question, additional research is required. Since changes in policies, incentivization schemes, roles of a scientist, and strategies have impact not only on Sciencepreneurship, this needs to thoroughly be thought through to cover positive effects.

Mindset and Entrepreneurial Education were also identified as major enabler, but also as major blocker. Here, the interviews outlined possibilities about how this might be changed for the better, though further research in this direction is definitely necessary. How can we integrate best entrepreneurial education in technical studies? How can we establish a culture that spin-offs and startups are perceived as sexy? How can the measure of success for scientists be adapted? How the policies change to foster more Sciencepreneurship? These were all questions that were raised in the interview process.

Moreover, the study unveiled the importance of partnerships and cooperations. Further research in that area can unveil aspects to foster Sciencepreneurship. Further research might reveal the reason why the phenomenon occurs and how it can be prevented from a holistic point of view.

The study as well unveiled that in Austria a lot is already available. Nevertheless, the density of provided services is very concentrated to the bigger cities and universities. Even in the bigger cities not all research facilities work with TTO offices or offer similar service. On national level the study also unveiled that some institutions are far ahead, in terms of offered services, then others. If the comparison is made on international level – there seems to be a lot to catch up for Austrian institutions to foster more spin-off creation. Additional research is needed to find a way of addressing this fact. Moreover, the study unveiled that there is a huge funding gap in prototype and product development. Further research might find a solution, how this can be changed for the better.

Key takeaways from this study are that there are inconsistencies in the offered services among the research institutions. The availability of risk capital in Austria is still big compared to other places in Europe. Nevertheless, a funding gap for prototype to product financing exists which needs to be closed. Additionally, the study acknowledges that a lot of positive things happen in Austria related to Sciencepreneurship. The spin-off rate is growing and with the right measures and changes this can be even more fostered and supported.

## 6. Conclusion

A lot of academics in technical fields – in Austria and all over the world – produce important results in research and develop new technologies or methods in various and different fields. However, the phenomenon can be observed that not many of these ideas or inventions reach the market as products. Finding barriers and enablers for Sciencepreneurship in technical fields in Austria was the main aim of this thesis. Based on the qualitative interviews and obtained data from three groups, the questions can be clearly answered as shown in the Result section. Three groups (TTOs, Researchers, and Spin-Offs) outlined their viewpoint during the interviews. The viewpoints were analyzed and triangulated. Furthermore, a coding and a categorization process was used to find overarching enablers and barriers.

The found enablers and barriers help in better understanding of the phenomenon stated. Based on this understanding, the phenomena were described better. Out of the enablers and barriers, policy makers and universities/research institutions can now define focus points and adaptations in their strategies and policies. The frequencies of enablers and barriers can be helpful to set focused measures and to make substantial adaptations where needed.

The results further indicate that help is needed for researchers to commercialize knowledge and become a Sciencepreneurs. One finding was that support systems like TTOs are not available everywhere in the needed quality and quantity. In recent decade, many universities in Austria established TTO-related services. The Technical University Vienna and the University of Technology Graz have the two biggest TTOs in Austria. Those TTOs already offer a wide range of services for spin-offs and startups. This message, also, came across in the interviews. Surprisingly, the funding landscape, which is quite big in Austria, is not well-known among the interviewed groups. Only the TTO offices know what is available, in terms of funding. Here, more support and awareness building would be beneficial.

The interviews showed evidence that there are funding gaps in product development. Developing a product out of a prototype takes time and resources. To reach the market with marketable products is more than essential. This limits researchers and leaves them with a lot of uncertainty. Very important as well, as outlined in multiple interviews, is entrepreneurial knowledge and the education of researchers. Many researchers have just a little or no entrepreneurial education. This is a barrier that blocks researchers in business plan development and related activities.

---

The interview data show evidence that collaboration between spin-offs and universities can be very fruitful. Trust and willingness to transfer patents in a fair manner was considered very positively. Furthermore, the data shows evidence that fair negotiations and the right commercialization strategy is necessary to foster spin-off creation and patent transfer.

The research showed as well that there is more room for further research to completely understand the phenomenon.

It can be concluded that the most important enablers for Sciencepreneurs in Austria are incubation, acceleration, and services, as well as, a comprehensive and good university and knowledge transfer strategy. For successful spin-offs, strong partnerships and cooperation are very important, as well as, a good and integrated entrepreneurial education.

The main blockers with the highest frequency for Sciencepreneurs in Austria are the currently implemented incentivization schemes and the lived role as a scientist. Additional barriers are the IP and Patent Process and the career perspectives and inflexibility for researchers.

## 7. References

ABA, 2018. *Public Funding for Startups in Austria*. [Online] Available at: <https://investinaustria.at/en/research-development/investment-incentives.php> [Accessed 04 01 2019].

Allan, G., 2003. A critique of using grounded theory as a research method. *Electronic Journal of Business Research Methods*, 2(1), pp. 1-10.

APLUSB, 2018. *Akademia plus business*. [Online] Available at: <https://www.aplusb.biz> [Accessed 05 01 2019].

AWS, 2018. *Main Page*. [Online] Available at: <https://www.aws.at/en/> [Accessed 04 01 2019].

Clarke, V. B. & V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, Issue 3(2).

Co, A., 2019. *Angel Co*. [Online] Available at: <https://angel.co/n26> [Accessed 13 01 2019].

De Nicola, M., Prencipe, A. & Corsi, C., 2018. The Effect of University Patent Activity on the Performance of University Spin-Offs. A Path Dependency Perspective. *International Journal of Business and Social Science*, Issue 9, pp. 91-98.

Dillet, R., 2019. *TechCrunch*. [Online] Available at: <https://techcrunch.com/2019/01/09/n26-raises-300-million-at-2-7-billion-valuation/> [Accessed 13 01 2019].

European Commission, 2018. *What is horizon 2020*. [Online] Available at: <https://ec.europa.eu/programmes/horizon2020/what-horizon-2020> [Accessed 05 01 2019].

FFG, 2018. *FFG – Austrian Research Promotion Agency*. [Online] Available at: <https://www.ffg.at/en/Start-up/FFG-Funding> [Accessed 04 01 2019].

Franzoni, C. & Lissoni, F., 2006. *Academic entrepreneurship, patents, and spin-offs: critical issues and lessons for Europe*, Milan: Università Commerciale Luigi Bocconi.

Hanh, A., 2019. *Der Standard*. [Online] Available at: <https://derstandard.at/2000095889379/Aufstieg-des-verlorenen-Finanz-Start-ups-N26> [Accessed 13 01 2019].

Hayter, C. S., Nelson, A. J., Zayed, S. & O'Connor, A. C., 2018. Conceptualizing academic entrepreneurship ecosystems: a review, analysis and extension of the literature. *Journal of Technology Transfer*, Issue 43, pp. 1039-1082.

Honorene, J., 2017. UNDERSTANDING THE ROLE OF TRIANGULATION IN RESEARCH. *Scholarly Research Journal's for interdisciplinary studies*, 04 05, pp. 91-95.

INITS, 2018. *INITS - Innovation into Business*. [Online] Available at: <http://www.inits.at> [Accessed 05 01 2019].

Jain, S., George, G. & Maltarich, M., 2009. Academics or entrepreneurs? Investigating role identity modification of university scientists involved in commercialization activity. *Research Policy*, p. 922–935.

Klofsten, M. & Jones-Evans, D., 2000. Comparing Academic Entrepreneurship in Europe – The Case of Sweden and Ireland. *Small Business Economics*, Volume 14, pp. 299-309.

Kolb, C. & Wagner, M., 2018. How university spin-offs differ in composition and interaction: a qualitative approach. *Journal of Technology Transfer*, Issue 43, pp. 734-759.

Marzocchi, C., Kitagawa, F. & Sanchez-Barrioluengo, M., 2017. Evolving missions and university entrepreneurship: academic spin-offs and graduate start-ups in the entrepreneurial society. *The Journal of Technology Transfer*, 09 09, Volume <https://doi.org/10.1007/s10961-017-9619-3>, pp. 1-22.

Mueller, P., 2006. Exploring the knowledge filter: How entrepreneurship and university–industry relationships drive economic growth. *Research Policy*, Volume 35, pp. 1499-1508.

Munari, F., Sobrero, M. & Toschi, L., 2018. The university as a venture capitalist? Gap funding instruments for technology transfer. *Technological Forecasting and Social Change*, Issue 127, pp. 70-84.

OECD, 2017. *OECD Economic Surveys: Austria 2017*. s.l.:OECD Publishing.

Schartinger, D., Rammer, C. & Fröhlich, J., 2006. Knowledge Interactions between Universities and Industry in Austria: Sectoral Patterns and Determinants . In: *Innovation Networks, and knowledge Spillovers*. Heidelberg: Springer.

Schartinger, D., Schibany, A. & Gassler, H., 2001. Interactive Relations Between Universities and Firms: Empirical Evidence for Austria. *Journal of Technology Transfer*, Issue 26, pp. 255-268.

Science Park Graz GmbH, 2018. *Sciencepark Graz*. [Online] Available at: <http://sciencepark.at> [Accessed 05 01 2019].

Siegel, D. S., 2018. Academic Entrepreneurship: Lessons Learned for Technology Transfer Personnel and University Administrators. *World Scientific Reference on Innovation*, Issue 1, pp. 1-21.

Smilor, R. W., Gibson, D. W. & Dietrich, G. B., 1990. University spin-out companies: technology startups from UT-Austin. *Journal of Business Venturing*, pp. 63-76.

Steffensen, M., Rogers, E. M. & Speakman, K., 2000. Spin-Offs from research centres at a research university. *Journal of Business Venturing*, 01, 15(1), pp. 93-111.

Steffensen, M., Rogers, E. M. & Speakman, K., 2000. Spin-Offs from research centres at a research university. *Journal of Business Venturing*, 01, 15(1), pp. 93-111.

TU Graz, 2018. *Reserach and Technology House*. [Online] Available at: <https://www.tugraz.at/en/tu-graz/organisational-structure/service-departments-and-staff-units/research-technology-house/> [Accessed 05 01 2019].

TU Graz, 2019. *Interactive start-up and spin-off map*. [Online] Available at: <http://lampx.tugraz.at/~startupmap/detail.php> [Accessed 05 01 2019].

TU Wien, T., 2018. *Forschungs und Transfersupport Tu Wien*. [Online] Available at: <https://www.tuwien.ac.at/index.php?id=5099> [Accessed 05 01 2019].

van Geenhuizen, M. & Soetanto, D. P., 2009. Academic spin-offs at different ages: A case study in search of key obstacles to growth. *Technovation*, pp. 671-681.

Wirtschaftskammer Österreich, 2018. *Horizon 2020: Förderung von Forschung und Innovation in Europa*. [Online] Available at: [https://www.wko.at/service/unternehmensfuehrung-finanzierung-foerderungen/HORIZON\\_2020.html](https://www.wko.at/service/unternehmensfuehrung-finanzierung-foerderungen/HORIZON_2020.html) [Accessed 05 01 2019].

Yancey , P. & Turner, M. & B. A., 1986. Grounded Theory and Organizational Research. *The Journal of Applied Behavioral Science*, 2(22), p. 141.

York, T. T., Gibson, C. & Rankin, S., 2015. Defining and Measuring Academic Success. *Practical Assesment, Research & Evaluation*, 03, 20(5).

# Appendix

## Interview Template

TTO's

TTO Office	
<b>1. Warmup</b>	
Date of Interview	xx.xx.2019
Name of Interviewer	Thomas Joham, BSc.
Name of Interviewee	
<p>Can I use your Name and Company name in the Thesis?</p> <p>YES <input type="checkbox"/> / NO <input type="checkbox"/></p> <p>Are you ok with named citations out of your interview?</p> <p>YES <input type="checkbox"/> / NO <input type="checkbox"/></p> <p>Are you requiring full anonymization?</p> <p>YES <input type="checkbox"/> / NO <input type="checkbox"/></p>	Signature of Interviewee
<p><b>Introduction:</b></p> <p>A lot of academics in technical fields, in Austria and all over the world, produce great results in research and develop new technologies or methods in various and different fields. However, the phenomenon can be observed that not much of this ideas or inventions reach the market as product. My thesis with the title “Barriers and Enablers to Sciencepreneurship in Austria – an empirical analysis” tries to find an answer to this question. What are enablers and barriers for scientists to commercialize ideas via spin-offs in Austria? Since a major part of this process is technology transfer at universities,</p>	



you, as employee in a Technology Transfer Office, are the ideal partner for this research interview.

The interview will take approximately 45 min

## 2. Questions to Answer

0. Briefly, can you tell me how does a day in the TTO at XXX look like?

1. How does the knowledge transfer strategy of your university / research institution look like?

2. What does the TTO at your university / research institution offer concretely to researchers?

3. What do researchers from your point of view need which you do not offer?

4. What were in the past the crucial enabling factors of your University's spin-offs (provided by TTO)?

5. What were in the past the crucial blockers for spin-offs at your University (from TTO)?

6. Do you have a program which assists scientists to develop the prototype to a product / which assist in business questions?

	7. What do you think researchers need in addition as a service to successfully spin-off?
	8. Does the TTO or your University provide entrepreneurial education for your scientists? (If Yes, which courses are offered?)
	I'd like now to move on to the topic of patents and licensing ...
	9. How long does the patent process take for a researcher? (bringing the idea – to granting the patent)
	10. What are the most common blockers for researchers in the patent application process?
	11. How high is the rate of patent attempts which do not make it through the commercialization process?
	12. How would you describe the demand in terms of licensing of new technologies from your patents in Austria?
	13. How do you assist the researchers in finding licensing partners or providing a network of partners / investors?

	I'd like now to move on to the last questions of the interview ...
	14. How many new patents do you have per year on average?
	15. How many spin-offs do you have per year on average?
	16. What are the topics which are relevant / interesting which we have not covered in the interview? What should I have asked in addition?
	17. With whom should I also do this interview?
	<b>18. Wrap-up and Clarifications</b>

## Researcher

Researchers	
<b>1. Warmup</b>	
Date of Interview	xx.xx.2019
Name of Interviewer	Thomas Joham, BSc.
Name of Interviewee	
<p>Can I use your Name and Company name in the Thesis?</p> <p>YES <input type="checkbox"/> / NO <input type="checkbox"/></p> <p>Are you ok with named citations out of your interview?</p> <p>YES <input type="checkbox"/> / NO <input type="checkbox"/></p> <p>Are you requiring full anonymization?</p> <p>YES <input type="checkbox"/> / NO <input type="checkbox"/></p>	Signature of Interviewee
<p><b>Introduction:</b></p> <p>A lot of academics in technical fields, in Austria and all over the world, produce great results in research and develop new technologies or methods in various and different fields. However, the phenomenon can be observed that not much of this ideas or inventions reach the market as product. My thesis with the title “Barriers and Enablers to Sciencepreneurship in Austria – an empirical analysis” tries to find an answer to this question. What are enablers and barriers for scientists to commercialize ideas via spin-offs in Austria? Since you are a scientist and an essential part of this process you are the ideal partner for this research interview.</p> <p>The interview will take approximately 45 min.</p>	

## 2. Questions to Answer - Researcher

0. Briefly, can you tell me about your research activities?

1. What are your thoughts on spin-off creation of one of your research findings?

2. What services are offered for researchers by your TTO office at your university / research institution?

3. What would you as researcher need in addition to spin-off scientific ideas?

4. Imagine you would spin-off an idea from your current position – How would you day look like with having a spin-off and a job as researcher?

5. What need to be changed in the role of a researcher that a spin-off creation is more likely?

6. Whom you would contact to get entrepreneurial experience or education? (Does your university offer entrepreneurial education?)

7. What are the main enablers for you as researcher to spin-off scientific inventions?

8. What are the main blockers for you as researcher to spin-off scientific inventions

	I'd like now to move on to the topic of patents and licensing ...
	9. What are your experiences with the TTO patent and licensing process?
	10. What need to be changed on the patent / licensing process from your point of view, to make it easier for you as researcher?
	11. How do you personally define scientific success?
	12. How does your university/ research institution define scientific success?
	13. What comes to your mind when talking about industry partnerships and licensing?
	I'd like now to move on to the last questions of the interview ...
	14. What possibilities you know in funding a scientific venture?
	15. What are the topics which are relevant / interesting which we have not covered in the interview? What should I have asked in addition?
	16. With whom should I also do this interview?

### 3. Wrap-up and Clarifications

## Spin-off

### Spin-Offs

#### 1. Warmup

Date of Interview	xx.xx.2019
Name of Interviewer	Thomas Joham, BSc.
Name of Interviewee	XXXXX
Can I use your Name and Company name in the Thesis?  YES <input type="checkbox"/> / NO <input type="checkbox"/>  Are you ok with named citations out of your interview?  YES <input type="checkbox"/> / NO <input type="checkbox"/>  Are you requiring full anonymization?  YES <input type="checkbox"/> / NO <input type="checkbox"/>	Signature of Interviewee

#### Introduction:

A lot of academics in technical fields, in Austria and all over the world, produce great results in research and develop new technologies or methods in various and different fields. However, the phenomenon can be observed that not much of this ideas or inventions reach the market as product. My thesis with the title “Barriers and Enablers to Sciencepreneurship in Austria – an empirical analysis” tries to find an answer to this question. What are enablers and barriers for scientists to commercialize ideas via spin-offs in Austria? Since a major part of this process are established spin-offs like yours, you are the ideal partner for the interview.

The interview will take approximately 45 minutes

## 2. Questions to Answer – Spin-Off

0. Briefly, can you tell me how your company was started?

1. What is your experience in spinning off from a university / research institution?

2. How was the support from the research institution / university in the spin-off process?

3. What were for you the key enablers in creating a spin-off company?

4. What were for you the key blockers, which made it hard for you in creating a spin-off company?

5. What other support did you get (FFG / AWS / Wirtschaftskammer / etc.) in founding your company?

6. Retrospectively, what would you have wished for as support from the University / research institution / or other institution?

7. Retrospectively, what would you do different today when you would spin-off again?



I'd like now to move on to the topic of patents, licensing and entrepreneurial experience ...

8. Have you bought out / taken over / filed patents – what was your experience in this process?

9. How was your experience / education in entrepreneurship before you founded the company?

10. How well connected have you been to your parent organization after spin-off?

I'd like now to move on to the last questions of the interview ...

11. What would you recommend other researchers who also want to spin-off their ideas?

12. What are the topics which are relevant / interesting which we have not covered in the interview? What should I have asked in addition?

13. With whom should I also do this interview?

### 3. Wrap-up and Clarifications

---

## Interview Summaries:

### TTO interviews

#### **TTO a**

The interviewee of TTO a is working in a service facility in charge of funding support, administration of Horizon 2020, training for third party finance optimization at a technical university in Austria. Part of this service facility is as well patent and licensing as well as technology transfer and industry cooperation. The focus lies especially on the region where the university is situated, as the interviewee outlines.

The facility organizes startup and spin-off fairs for the region. This is seen as huge enabler by the interviewee. The interviewee is as well very proud of the startup funding support which his facility offers. This can be considered as an enabler as well. The facility as well provides a startup map to the industry to increase awareness about startup activities.

The interviewee outlined that the university has a comprehensive knowledge transfer strategy which is clearly perceived as enabler. Startups and spin-offs are clearly supported from the university by the knowledge transfer strategy. Equity ownership of the university in the new companies is not part of it. Licensing and transfer of IP to spin-offs were very much emphasized by the interviewee as enabler.

Other enablers mentioned:

- Good idea with underlying IP
- Entrepreneurial knowledge and support by Incubators
- University and Professors support spin-off activities
- Funding landscape in Austria
- University support in developing prototypes and products
- Lean patenting process and support in IP creation
- Industry partner network

As blockers interviewee mentioned the jobs which are offered by bigger companies in the region. The uncertainty of being an entrepreneur is according to the interviewee a blocker as well. As well the career-option to stay in research is a blocker. Then success is measured on publications. Career goals of scientists usually hinder them to spin-off the interviewee said.

---

Another major blocker for scientists to create IP and spin-offs is that the publication is made too early. Every chance of getting an IP is lost. Focusing on the patent process the quality of patent descriptions are very poor sometimes. The interviewee emphasizes that this also is a major blocker in creating more IP.

The monetary benefits which are not seen by the scientists are not fostering IP and spin-off creation at the moment. This is as well emphasized as a blocker by the interviewee. Another big blocker is that many patents are promised for industry partners – this makes spin-off creations less likely and hinder researchers to pursue the opportunity via a spin-off.

In the end the interviewee emphasized that also the university can look for entrepreneurial professors if new professor positions are opened / need to be filled. This can then foster the entrepreneurial university of the future as well.

### **TTO b**

Interviewee b is working on a research facility in Austria which is not connected to a University. The research facility is funded fully by the government. The interviewee is working in the so-called business development role. Business development in this facility consists of everything from business plan to commercialization. Digitalization is as well a big part of the role. Main focus lies on enabling innovation and results which should reach the market.

The knowledge transfer strategy is implemented in a vertical structure. Business development managers are located in each competence center to foster the knowledge transfer directly. This has been clearly seen as enabler according to the interviewee.

Historically the facility is a research focused organization. Nevertheless, the ideal way is that research happens if there is already need on the market. The facility performs a shift at the moment to get more market oriented. This is seen as future enabler. The facility has a view spin-off already and also tries to encourage further spin-offs. This is seen as enabler as well as that there is a small funding opportunity provided. Another enabler is definitely a strong cooperation a network of industry partners.

As a barrier, was clearly named by the interviewee, a financial gap in developing a laboratory prototype to marketable product. The available funding possibility is limited at the institution. Using private money, as a scientist, to breach the gap, is not often happening. Further, barriers named are budget and competency loss for the competency unit within the organization. The

---

current management structure does not enable spin-offs. There is no incentivization from management perspective at the moment which was highlighted by the interviewee as barrier too.

The facility does also not offer any kind of accelerator or incubator. The facility also does not offer entrepreneurial experience or education to its scientists. This was identified as barrier too by the interviewee.

Further, the interviewee outlined that the patent process in general takes quite long. In General, the interviewee emphasized that the motivation for scientist to create IP is limited at the facility. The working contract at the facility was here identified as blocker as well as the incentivization to create IP for the facility. The facility is very much linked to industry partners and projects. Which is then also very difficult to spin-off since per contract the IP lies usually with the industry partner.

The interviewee also outlined that he and the facility is aware that some processes need to be adapted and changed. The process has already started, as well as a centralized patent process and a strategy of knowledge transfer is to improve the process.

### **TTO c**

TTO c is working in a big University in Austria. TTO c described the job in the TTO as very diverse and interesting. It is fast paced and everyday looks different. The services offered range from patent management, contract management, developing a knowledge transfer strategy to industry cooperation and the organization of fairs and partner events. The knowledge transfer strategy of the university consists of cross functional topics and a very strong networking between the different departments in the TTO. The university is open for every kind of knowledge transfer and happy to assist researchers in every demand even if there is no experience yet. The TTO offers an incubation space as well as a partner of INITS.

With all things offered, TTO c reported in the interview that more resources would be necessary to support scientists better. This is always a problem since the university is very big compared to the TTO. Additionally, as a current blocker was outlined that there is very poor prototype and product development support available. There is a micro fund available, but the money is not enough for the majority of product prototypes. A further barrier is the

expectation from scientists who want to spin-off. Reality looks in the end sometimes different. Also, the role and life of an entrepreneur is different to the life of a researcher. This difference was named as a barrier to by TTO c.

Enablers mentioned by TTO c are:

- Support Innovation and Incubation Centre
- Support by the University rector
- Networking events to meet entrepreneurs and spin-offs
- Mindset of the researchers
- Fair negotiations in IP transfer and
- Trust between University and researchers

The IP and Patent process depends very strongly on the researcher experience with the process. The procedure is quite quick and lean according to TTO c. Difficulties and barriers relate to the question of who is the co-inventor and to early presentations which lead to a “no patentable” state. As also outlined by TTO c it is not a big problem if publications come before the patent process. “Not everything needs to be patented, this is part of the strategy”, TTO c.

Difficulties for the TTO lie in the matching process between licensing interested party and the patent itself. The university has technologies and need to find someone who can use it. This was strongly seen as a barrier by TTO c. “Matching is difficult – it happens but not so often – unfortunately” TTO c.

TTO c outlined the importance as well of adapting the processes and methods to modern technologies. This can then boost the licensing and commercialization activity within a university.

## Researcher interviews

### Researcher a

Researcher a is working in a private research institution and is focused on microscopic devices for research in biology. Technologies used are existing, but the integration of the

technologies is new. Researcher a and colleagues thinking often about spin-off creation. Nevertheless, there is no one in house who guides them. This was seen as a barrier. Also, the knowledge of senior researchers on how much commercial value it has, is seen as a barrier. Currently there is nothing like TTO or business development in the institution where Researcher a is working in. This is seen as current barrier nevertheless, researchers would need a TTO which assists to help defining a business plan, helps in commercialization and teaches the necessary tools. This would then be a real enabler for the researchers according to Researcher a. Other needs mentioned:

- Funding support
- Product market fit
- Entrepreneurial education

The role of a scientist might need to change as well as outlined by Researcher a. Flexible time and understanding in the scientific community that spending time on a business venture is no monumental waste of time and can be enabler in future, at the moment it's a barrier. Not only publication should count. Further the environment is not supportive for scientists and the cost of failure for risking the scientific career appears to high according to Researcher a. This is also a barrier for spinning off.

Other mentioned enables were:

- Help in recognizing commercial value
- Support in Vienna / Austria (Support systems)
- Funding landscape
- Establish a TTO office for patent / licensing / spin-off activities
- Entrepreneurial knowledge and education

## **Researcher b**

Researcher b is working in a research institution in Austria. Researcher b's specialization is about thermal energy systems, head pumps and thermal energy storages. Researcher b thought recently about spinning off one of the research ideas. In the past during the PHD thesis there was the thinking about spinning off the work, Researcher b said. A tricky

dimension according to the researcher is the development from the prototype to a marketable product. In the research institution there is no defined procedure how spinning off can work. This was outlined as a major blocker at researcher b's place of work. What steps need to be taken? What company structure is preferred? How will be the involvement of the institution? – all unclear and major barriers. The shareholder agreement of the institution where Researcher b is working in also not enables spin-offs. Researcher b outlined that every euro needs to be invested in science. As another barrier was seen that there are no best practices of successful spin-offs at the institution. Researcher b outlined as well that there is no classical TTO at the institution. No centralized form of knowledge transfer which was also outlined as major barrier. Moreover, it is organized in the role of business development. This role helps defining the market and defining an exploration strategy. This is seen as an enabler by Researcher b. Researcher b also emphasized that a structure or a step by step guide would be helpful. Initial information was crucial for Researcher b. Support in internal processes was also seen as an enabler as well as entrepreneurial support and education. Researcher b emphasized that supervision in business plan development (how to make money from an invention) would be a beneficial enabler. As a major enabler was outlined as well that the possibility for researchers to focus on the venture and less on acquiring new projects is given by the institution.

Publishing regulations for researchers in general are seen currently as barrier. If this would be changed it can change to an enabler. The institution where researcher b is working in does not offer entrepreneurial education or help. This was seen as a barrier for researchers working in this institution. Further mentioned enablers:

- Mentoring and information availability
- Entrepreneurial education
- Incentive system
- Coaching for the process of prototype – marketable product

“Good scientists always have the idea in mind how a product of the invention can look like” Researcher b

Scientific success, how it is defined at the moment was also seen as a barrier. Its only about publication and getting more projects and funding. The outer layer needs to be considered

as well. Taking over IP is very hard at this institution because everything is developed with an industry partner which holds the IP. This is seen also as a current barrier.

### **Researcher c**

Researcher c works as a full professor at a University in Austria. The interviewee was part in a spin-off situation in the past where the students created a spin-off out of research activities. The interviewee said that it was a unique experience for a professor to be part of such a process. The interviewee was not part in the new firm but was acting as mentor for the founders. “I did not invest equity but time”.

The interviewee was aware what the TTO offers at the university. As enabler was seen that the TTOs offering trainings how to develop a prototype into a product. Further the TTO is engage in innovation breakfasts and networking with startups. The interviewee said that this are all enablers for successful spin-offs. Nevertheless, the mindset which is different at European universities compared to the ones in US was outlined as barrier. Cultural issues that being an entrepreneur is not sexy enough are also perceived as barrier. To accelerate more spin-offs in future a mindset shift needs to happen. The idea of being an entrepreneur is sexy and can be already seeded during earlier educational processes. This would help building the mindset for researchers that spin-offs are good and sexy.

The role and incentivization for researchers were seen as well as a barrier. The role of researcher might need to be adapted to encourage more knowledge transfer via spin-offs. Success measures might be adapted e.g. “Measuring success on how many students which I educated are successful in their field”. The flexibility between industry and academia was seen as crucial factor for the future by the interviewee. Part time or hybrid professorships can also work as an incentive for spin-off activities. Unfortunately, this is a barrier at the moment. The interviewee was aware that the university offers entrepreneurial education for its researchers and students. This was seen as an enabling factor by the interviewee. Further enabling factors mentioned are:

- Mindset, entrepreneurial thinking among scientists
- Services offered by TTO
- Tight cooperation with industry
- Start early in entrepreneurial education



---

The main blockers mentioned by the interviewee are:

- Academic habitus is against it
- Exclusiveness of academia
- Superior thinking
- Measurement of academic success and academic inflexibility
- Linear and specific career path

The interviewee outlined as well that there is a big discrepancy from the understanding of scientific success as a person and how the scientific world interprets success. The interviewee also mentioned the ambivalent feeling about industry partnerships. On the one hand universities should be independent and not the workbench of the industry. The government need to be very careful in setting up such roles. On the other hand, it is needed to get additional funding and inventions which are needed on the market.

## Spin-off interviews

### **Spin-off a**

Spin-off a has a strong technical reference of non-metal materials for 3d printing. It was initially created at a University as research project. Since the beginning the research team consisted of a very interdisciplinary group of researchers out of process technology, chemistry and material science. Back then at the university the focus was already to develop and improve methods and processes. The spin-off was then created from PhD students and their professor. The university was never and is also not currently involved in terms of ownership. The overall experience in spinning off from a university was described as semi-professional. The university helped a lot in transferring the initial IP via a licensing contract. Other support experiences were rather poor. There were no hubs or incubators available at the university at the time of founding the firm. The interviewee outlined that it is very important that the involved persons are aware that the operationalization from a prototype lies on the shoulders of the young people – full commitment is required. The interviewee outlined that a major enabler was the initial IP transfer and the help of the university. This is a tricky topic in the beginning. Another enabler is mindset and willingness to invest a lot for all participants. As major blockers the interviewee outlined infrastructural issues. The experience at the university for spin-offs and their needs is missing. As well it was not easy in Vienna to find sustainable office and production space which enables

---

sustainable growth. The interviewee outlined that this was their major blocker. As another barrier the pressure of commercialization was named. In the beginning the spin-off need to develop products out of a prototype. This takes time and if the pressure is too high it can create lots of problems. Additionally, if VC funds are too early on board this pressure increases tremendously. The interviewee and his company had a strategic investor from the beginning which gave them the time to develop and grow sustainable products. This partnership is seen as an enabler by the interviewee. Having partners to talk to in any matter is crucial for the firm's health. Another enabler for the interviewee is the basic understanding of entrepreneurship, the interviewee had this in the beginning. Knowledge or ability to deal with contracts is very important as well.

The interviewee described also the importance of creating own IP as a new company. In the beginning IP was licensed from the university nevertheless, the interviewee outlined that this is not enough for sustainable growth. Therefore, the company created its own IP afterwards which is seen as success factor. The partnership with the university was rather loose in the first years. The interviewee outlined the importance for the company to be independent and have a true cost overview (truth of costs). The interviewee said that some companies park people in research projects sheet. The company of the interviewee decided consciously against it. It then looks better on the balance. After two years a research project was started together with the parent university. Not because it was needed but it was a topic fit – emphasized by the interviewee.

### **Spin-off b**

The interviewee of Spin-off b founded the company during his PhD thesis with a colleague. The company is focused on robotics and multi agent systems. During the PhD thesis the interviewee was already working closely together with an industry partner. This partner as well enabled the spin-off with financing. This was outlined as a major enabler to have a strategic partner right from the beginning. It's very important to have time to develop a prototype and further a product. In the beginning the relationship and support from the university was semi optimal. In the beginning it was very hard, the interviewee outlined. The longer it took, the better the relationship went. The interviewee outlined that in the end he even could finish his PhD. The takeover of IP was also in the end fine – a good deal was reached. The interviewee, nevertheless, described the procedure as semi optimal and outlined it was a bit of a blocker.

---

Enabling factors mentioned:

- Strong and knowledgeable team
- Strategic partners
- Fascination for the topic
- Funding landscape in Austria

As barrier was clearly outlined that there have been not enough incubation or acceleration support in the beginning. The university structures as well are not built yet for supporting and accelerating spin-offs. Further the interviewee mentioned as barrier that there is a huge time constraint for researchers who want to spin-off. The scientific community is also not in favor as well as the success measures for researchers hinder spin-offs.

The spin-off took over patents from the university, but the interviewee outlined that soon they realized that they need to create own IP to succeed on the market. As a clear enabler was as well outlined that entrepreneurial education is very important. The interviewee did free courses at the University to broaden the economic knowledge. The rest was achieved by learning by doing.

The interviewee outlined in the end how important the understanding of the customer is for a successful spin-off. The feedback integration and business plan creation is a crucial step where help is highly appreciated.

## Datasheet

Category	Theme	Subtheme	Question	Code
TTO	Enabler	Incubation, Acceleration and Services	0	Service
TTO	Enabler	Incubation, Acceleration and Services	0	funding advisory
TTO	Enabler	Incubation, Acceleration and Services	0	Talent Management & Recruiting
TTO	Enabler	Incubation, Acceleration and Services	0	Patents and Licensing
TTO	Enabler	Incubation, Acceleration and Services	0	Industry cooperation
TTO	Enabler	Incubation, Acceleration and Services	0	Startup fair
TTO	Enabler	Incubation, Acceleration and Services	0	founding support
TTO	Enabler	Incubation, Acceleration and Services	0	spin-off IP licensing
TTO	Enabler	Resources and infrastructure	0	Startup Landscape
TTO	Enabler	Resources and infrastructure	0	Accelerator / Incubator
TTO	Enabler	University and Knowledge Transfer Strategy	0	Entrepreneurial University
TTO	Enabler	University and Knowledge Transfer Strategy	1	Commercialization
TTO	Enabler	University and Knowledge Transfer Strategy	1	University knowledge transfer strategy
TTO	Enabler	University and Knowledge Transfer Strategy	1	University knowledge transfer strategy
TTO	Enabler	University and Knowledge Transfer Strategy	1	University knowledge transfer strategy
TTO	Enabler	IP and Patent Process	3	IP necessary
TTO	Enabler	Environment for Scientists	3	Entrepreneurial University
TTO	Enabler	Resources and infrastructure	3	Accelerator / Incubator
TTO	Enabler	Environment for Scientists	3	Entrepreneurial University
TTO	Enabler	Incubation, Acceleration and Services	3	Funding advisory
TTO	Enabler	Product development	3	Prototype development support
TTO	Barrier	Incentivization and role as a scientist	4	Better workplace offer
TTO	Barrier	Mindset and motivation	4	Security and stability
TTO	Barrier	Career	4	Science career option
TTO	Enabler	Product development	5	Prototype development support
TTO	Enabler	Product development	5	Prototype development support
TTO	Barrier	Career	6	Career goals
TTO	Barrier	Incentivization and role as a scientist	6	No Entrepreneurship support
TTO	Enabler	Entrepreneurial education	7	Entrepreneurial education
TTO	Enabler	Entrepreneurial education	7	include in teaching plan
TTO	Enabler	IP and Patent Process	8	Lean process of patenting
TTO	Barrier	IP and Patent Process	9	publications too early
TTO	Barrier	IP and Patent Process	9	Patent quality poor
TTO	Barrier	Incentivization and role as a scientist	9	no monetary benefit for researcher
TTO	Barrier	Partnerships and Cooperations	9	Promised IP to industry partners
TTO	Enabler	Entrepreneurial education	11	Knowledge creation education
TTO	Enabler	Partnerships and Cooperations	11	IP not for free Industry likes cooperation with
TTO	Enabler	Partnerships and Cooperations	11	university

TTO	Enabler	Partnerships and Cooperations	11	competitive advantage
TTO	Enabler	Partnerships and Cooperations	12	Network of partners
TTO	Enabler	IP and Patent Process	13	Duty inventions
TTO	Enabler	IP and Patent Process	13	Patents granted
TTO	Enabler	University and Knowledge Transfer Strategy	14	Yearly Spin-offs
TTO	Enabler	University and Knowledge Transfer Strategy	14	Yearly start ups
TTO	Enabler	University and Knowledge Transfer Strategy	15	Entrepreneurial University
TTO	Enabler	Incubation, Acceleration and Services	0	Service
TTO	Enabler	Incubation, Acceleration and Services	0	Digitalization
TTO	Enabler	University and Knowledge Transfer Strategy	0	Feedback
TTO	Enabler	Incubation, Acceleration and Services	1	Business developers in competence units
TTO	Enabler	Incubation, Acceleration and Services	1	Service
TTO	Enabler	Incubation, Acceleration and Services	1	Works quite well
TTO	Enabler	University and Knowledge Transfer Strategy	2	Research where need on the market
TTO	Enabler	University and Knowledge Transfer Strategy	2	Research based organization
TTO	Enabler	University and Knowledge Transfer Strategy	2	Shift to customer based
TTO	Enabler	University and Knowledge Transfer Strategy	2	Market relevant projects
TTO	Enabler	Partnerships and Cooperations	2	Industry cooperation
TTO	Barrier	Resources and infrastructure	2	Accelerator / Incubator
TTO	Enabler	Environment for Scientists	2	Entrepreneurial University
TTO	Enabler	Incubation, Acceleration and Services	3	Funding possibility available
TTO	Enabler	Incubation, Acceleration and Services	3	funding advisory
TTO	Enabler	Incubation, Acceleration and Services	3	later seed money
TTO	Barrier	Product development	4	Financial gap in prototype development
TTO	Barrier	Product development	4	Own money for breaching gap
TTO	Barrier	Incentivization and role as a scientist	4	Loosing people and income – management
TTO	Enabler	Incubation, Acceleration and Services	5	Business developer with impulses
TTO	Enabler	Incubation, Acceleration and Services	5	Business developer with impulses
TTO	Enabler	Mindset and motivation	6	Personal motivation of scientists
TTO	Barrier	Resources and infrastructure	6	No money for further development
TTO	Barrier	Incentivization and role as a scientist	6	Scientists need to find new project
TTO	Enabler	Incubation, Acceleration and Services	6	Funding opportunity to breach gap
Researcher	Enabler	Entrepreneurial education	3	Entrepreneurial knowledge
TTO	Barrier	IP and Patent Process	8	patent process takes long
TTO	Barrier	IP and Patent Process	9	no motivation to patent
TTO	Barrier	Incentivization and role as a scientist	9	No incentivization for patents
TTO	Barrier	IP and Patent Process	9	big effort for small gain holding patents but no commercialization
TTO	Barrier	University and Knowledge Transfer Strategy	11	strategy
TTO	Enabler	University and Knowledge Transfer Strategy	12	Started to think about licensing and products
TTO	Enabler	IP and Patent Process	13	Duty inventions
TTO	Enabler	IP and Patent Process	13	Patents granted
TTO	Enabler	University and Knowledge Transfer Strategy	14	Yearly Spin-offs

TTO	Enabler	University and Knowledge Transfer Strategy	14	Yearly start ups
TTO	Enabler	Incubation, Acceleration and Services	0	patent management
TTO	Enabler	Incubation, Acceleration and Services	0	knowledge transfer strategy
TTO	Enabler	Incubation, Acceleration and Services	0	Industry cooperation
TTO	Enabler	Incubation, Acceleration and Services	1	networking within TTO
TTO	Enabler	University and Knowledge Transfer Strategy	1	openness
TTO	Enabler	Incubation, Acceleration and Services	1	spin-off support and encouragement
TTO	Enabler	Incubation, Acceleration and Services	2	funding support
TTO	Enabler	Partnerships and Cooperations	2	Industry cooperation
TTO	Enabler	Incubation, Acceleration and Services	2	Contract and advocate support
TTO	Enabler	Incubation, Acceleration and Services	2	patent and license management
TTO	Enabler	Incubation, Acceleration and Services	2	Marketing and International support
TTO	Enabler	Incubation, Acceleration and Services	2	founding support
TTO	Enabler	University and Knowledge Transfer Strategy	2	support from university
TTO	Enabler	University and Knowledge Transfer Strategy	2	building trust
TTO	Barrier	Resources and infrastructure	3	resources
TTO	Barrier	Product development	3	prototype development support
TTO	Enabler	Resources and infrastructure	4	Accelerator / Incubator
TTO	Enabler	University and Knowledge Transfer Strategy	4	University knowledge transfer strategy
TTO	Enabler	Partnerships and Cooperations	4	Network of partners
TTO	Enabler	Mindset and motivation	4	Mindset
TTO	Enabler	University and Knowledge Transfer Strategy	4	Fairness
TTO	Barrier	Mindset and motivation	5	Expectations
TTO	Barrier	Incentivization and role as a scientist	5	Researcher vs entrepreneur
Researcher	Enabler	Incubation, Acceleration and Services	3	TTO would be helpful
TTO	Enabler	Product development	6	TTO happy to support in prototype development
TTO	Barrier	IP and Patent Process	9	Knowledge of Patent process
TTO	Barrier	IP and Patent Process	9	Depends on person priorities and time
TTO	Barrier	Partnerships and Cooperations	12	Matching Process difficult
TTO	Enabler	Partnerships and Cooperations	12	Technology Scouts
TTO	Enabler	Partnerships and Cooperations	13	Network of partners
TTO	Enabler	IP and Patent Process	14	Patents granted
TTO	Enabler	University and Knowledge Transfer Strategy	16	adaption on new trends
Researcher	Enabler	Mindset and motivation	1	Thinking often about it
Researcher	Barrier	Incubation, Acceleration and Services	1	No guidance / example in house
Researcher	Enabler	Entrepreneurial education	7	Recognizing commercial value
Researcher	Enabler	Incubation, Acceleration and Services	7	Funding landscape
Researcher	Enabler	Incubation, Acceleration and Services	2	Distributed TTO
Researcher	Enabler	Entrepreneurial education	3	Entrepreneurial education
Researcher	Enabler	Environment for Scientists	4	Time dedication to run a spin-off
Researcher	Enabler	Incentivization and role as a scientist	5	Flexible time allocation
Researcher	Barrier	Environment for Scientists	5	Resonance with scientific community
Researcher	Barrier	Incentivization and role as a scientist	5	Success as scientist

Researcher	Enabler	Entrepreneurial education	7	Entrepreneurial education
Researcher	Enabler	Entrepreneurial education	7	Understand the customer high risk in jeopardizing scientific career
Researcher	Barrier	Career	7	career
Researcher	Enabler	Incubation, Acceleration and Services	2	Describing the market
Researcher	Barrier	Environment for Scientists	8	Environment not supportive
Researcher	Barrier	Career	8	Cost of failure Lack of knowledge in patenting process
Researcher	Barrier	IP and Patent Process	9	Patent and Licensing process
Researcher	Barrier	IP and Patent Process	10	beneficial
Researcher	Enabler	Incubation, Acceleration and Services	2	TTO helps in exploiting the result
Researcher	Barrier	Career	11	paying high price
Researcher	Barrier	University and Knowledge Transfer Strategy	11	basic research & society
Researcher	Enabler	University and Knowledge Transfer Strategy	11	close knowledge gaps with science
Researcher	Barrier	Partnerships and Cooperations	13	Who holds the IP
Researcher	Enabler	Partnerships and Cooperations	13	Always close cooperation
Researcher	Enabler	Entrepreneurial education	2	training on idea transfer
Researcher	Enabler	Mindset and motivation	1	Thinking often about it
Researcher	Barrier	University and Knowledge Transfer Strategy	1	Licensing with Industry Partner
Researcher	Barrier	Resources and infrastructure	1	Capital intensity of Invention
Researcher	Enabler	Incubation, Acceleration and Services	2	Marketing and customer feedback
Researcher	Enabler	Incubation, Acceleration and Services	3	Supervision in business plan dev.
Researcher	Barrier	University and Knowledge Transfer Strategy	1	All money needs to be invested
Researcher	Enabler	Incubation, Acceleration and Services	7	Mentoring
Researcher	Enabler	Incubation, Acceleration and Services	14	Tons of funding possibilities
Researcher	Enabler	Incubation, Acceleration and Services	1	mentoring students
Researcher	Enabler	Incubation, Acceleration and Services	1	mentoring company Dependency on Technology readiness index
Researcher	Enabler	University and Knowledge Transfer Strategy	2	readiness index
Researcher	Enabler	Incubation, Acceleration and Services	2	Everything from scratch
Researcher	Barrier	IP and Patent Process	2	IP rights
Researcher	Enabler	Incubation, Acceleration and Services	7	Facilities and services of TTO
Researcher	Barrier	Incubation, Acceleration and Services	3	Role Models and Best Practices
Researcher	Barrier	Incubation, Acceleration and Services	3	Structured approach
Researcher	Enabler	Incubation, Acceleration and Services	14	Funding landscape
Researcher	Barrier	University and Knowledge Transfer Strategy	3	Support in internal processes
Researcher	Enabler	Entrepreneurial education	2	basic education - idea breakfasts
Spin Off	Enabler	Incubation, Acceleration and Services	3	Funding landscape
Researcher	Barrier	Career	4	Sake of publishing
Researcher	Barrier	Incentivization and role as a scientist	4	Working on many different topics
Researcher	Barrier	Incentivization and role as a scientist	4	Responsibility
Researcher	Barrier	Incentivization and role as a scientist	4	Customer focus
Researcher	Barrier	Incentivization and role as a scientist	4	Scientific projects
Researcher	Barrier	Incentivization and role as a scientist	4	Shift to customer focus
Researcher	Barrier	Incentivization and role as a scientist	5	Positive role models needed

Researcher	Barrier	Incentivization and role as a scientist	5	Incentivization system adaption
Researcher	Enabler	Entrepreneurial education	2	networking with experts and startups
Researcher	Enabler	Entrepreneurial education	5	Awareness and education
Spin Off	Enabler	Incubation, Acceleration and Services	5	FFG funding
Researcher	Enabler	Incentivization and role as a scientist	7	incentivization system
Researcher	Enabler	Entrepreneurial education	6	MBA
Researcher	Barrier	Ip and Patent Process	9	Old and not lean
Researcher	Barrier	Ip and Patent Process	9	Approval process
Researcher	Barrier	Incentivization and role as a scientist	9	incentivization system
Researcher	Barrier	IP and Patent Process	9	Patent attorney
Researcher	Barrier	IP and Patent Process	9	Nu further TTO support
Researcher	Barrier	IP and Patent Process	9	IP with company
Researcher	Barrier	IP and Patent Process	10	hard to do it differently
Researcher	Enabler	University and Knowledge Transfer Strategy	11	idea of commercialization in mind
Researcher	Barrier	Career	11	Scientific success measure
Researcher	Barrier	Career	11	Shift in scientific success measure
Researcher	Barrier	Career	12	Success measure
Researcher	Barrier	Partnerships and Cooperations	13	Super hard partnerships
Researcher	Barrier	Partnerships and Cooperations	13	IP Ownership
Researcher	Barrier	Partnerships and Cooperations	13	How to price the IP
Researcher	Enabler	University and Knowledge Transfer Strategy	13	Part of strategy
Spin Off	Enabler	Incubation, Acceleration and Services	6	Entrepreneurial support
Spin Off	Enabler	Incubation, Acceleration and Services	6	Funding landscape guidance
Researcher	Enabler	Mindset and motivation	1	acceptance by user
Spin Off	Enabler	Incubation, Acceleration and Services	7	Accelerator / Incubator
Spin Off	Enabler	Incubation, Acceleration and Services	11	Business plan and customer needs
Spin Off	Enabler	Incubation, Acceleration and Services	11	feedback
Researcher	Enabler	Entrepreneurial education	7	Student education
Spin Off	Enabler	Entrepreneurial education	5	Entrepreneurial education
Spin Off	Enabler	Entrepreneurial education	9	Basic education
Researcher	Barrier	Mindset and motivation	3	Different mindset cool and sexy in USA not in Europe
Researcher	Barrier	Mindset and motivation	3	Europe
Researcher	Barrier	Incentivization and role as a scientist	3	Part time professorship be dependent appears not very attractive
Researcher	Barrier	Incentivization and role as a scientist	5	attractive
Spin Off	Enabler	Entrepreneurial education	12	be able to deal with law and contracting
Researcher	Barrier	Career	5	different success measures
Researcher	Barrier	Incentivization and role as a scientist	5	hybrid job
Spin Off	Enabler	Entrepreneurial education	0	market gap found in research
Researcher	Enabler	Incentivization and role as a scientist	7	incentivization system
Researcher	Enabler	Mindset and motivation	7	Mindset and entrepreneurial knowledge
Spin Off	Enabler	Incubation, Acceleration and Services	11	look our for funding opportunities
Researcher	Enabler	Partnerships and Cooperations	7	Industry cooperation



Spin Off	Enabler	Entrepreneurial education	3	partner
Researcher	Barrier	University and Knowledge Transfer Strategy	8	Exclusiveness and support of academia
Researcher	Barrier	Incentivization and role as a scientist	8	Time restriction for professors
Researcher	Barrier	Career	8	inflexibility and linear prof. career
Researcher	Enabler	Career	11	creating knowledge
Researcher	Enabler	Career	11	education and successful students
Researcher	Enabler	University and Knowledge Transfer Strategy	11	knowledge transfer to society
Researcher	Barrier	Career	12	number of publications
Researcher	Barrier	Partnerships and Cooperations	13	Industry cooperation ambivalent feeling
Researcher	Barrier	Partnerships and Cooperations	13	independence of economic interest
Researcher	Barrier	Partnerships and Cooperations	13	Not mutual exclusive knowledge need to be publicly available
Researcher	Barrier	Partnerships and Cooperations	13	available
TTO	Barrier	Incubation, Acceleration and Services	6	micro fund but tight budget
Researcher	Enabler	Incentivization and role as a scientist	15	Agencies and mediators
Spin Off	Enabler	Partnerships and cooperations	0	With a partner continuous development and improvement
Spin Off	Enabler	Mindset and motivation	0	improvement
Spin Off	Enabler	Ip and Patent Process	0	No equity for University
Spin Off	Enabler	Mindset and motivation	1	fast learning
Spin Off	Enabler	Mindset and motivation	1	being ready for it
Spin Off	Barrier	University and Knowledge Transfer Strategy	2	Semiprofessional support
Spin Off	Enabler	IP and Patent Process	2	Ip transfer
Spin Off	Barrier	Resources and infrastructure	2	to high rent at university
Spin Off	Enabler	Ip and Patent Process	3	Ip transfer
Spin Off	Enabler	Mindset and motivation	3	mindset to invest everything
Spin Off	Barrier	Resources and infrastructure	4	Infrastructure
Spin Off	Barrier	Incubation, Acceleration and Services	4	missing experience
Researcher	Barrier	Incubation, Acceleration and Services	2	No TTO Office
Spin Off	Barrier	Product development	4	Prototype development support
Spin Off	Enabler	Partnerships and cooperations	5	Strategic investor
Spin Off	Enabler	Entrepreneurial education	9	free courses
Spin Off	Barrier	Resources and infrastructure	6	Infrastructure
Spin Off	Enabler	Ip and Patent Process	8	Ip transfer
Spin Off	Barrier	University and Knowledge Transfer Strategy	8	University knowledge transfer strategy
Spin Off	Enabler	IP and Patent Process	8	generate own IP
TTO	Barrier	Entrepreneurial education	7	Entrepreneurial education
Spin Off	Enabler	Mindset and motivation	9	Own interest
Spin Off	Enabler	Mindset and motivation	9	learning by doing
Spin Off	Enabler	Partnerships and cooperations	10	Loose linkage to university
Spin Off	Enabler	Partnerships and Cooperations	10	independence
Spin Off	Enabler	Product development	10	True cost overview important
Spin Off	Enabler	Mindset and motivation	11	ready to invest a lot
Spin Off	Enabler	Mindset and motivation	11	mindset and behavior

Spin Off	Enabler	Partnerships and cooperations	11	Diverse team
Researcher	Barrier	Entrepreneurial education	1	Lack of knowledge how to spin off
Researcher	Barrier	Entrepreneurial education	6	Entrepreneurial education
Spin Off	Barrier	Partnerships and Cooperations	1	hard in the beginning
Spin Off	Barrier	Incubation, Acceleration and Services	1	less experience and alone
Spin Off	Enabler	IP and Patent Process	1	Ip transfer
Spin Off	Barrier	University and Knowledge Transfer Strategy	2	no support in the beginning
Spin Off	Barrier	Partnerships and Cooperations	2	after a while support increased
Spin Off	Enabler	Partnerships and cooperations	3	super team
Spin Off	Enabler	IP and Patent Process	3	knowledge
Researcher	Barrier	Entrepreneurial education	14	Funding opportunity to breach gap
Researcher	Barrier	Incubation, Acceleration and Services	10	Create a TTO office
Researcher	Barrier	Incubation, Acceleration and Services	1	how spinning-off works
Spin Off	Barrier	University and Knowledge Transfer Strategy	4	University Structure and Strategy
Spin Off	Barrier	Environment for Scientists	4	time restriction for scientists
Spin Off	Barrier	Career	4	acceptance by scientific community
Spin Off	Enabler	Partnerships and cooperations	5	Strategic investor
Researcher	Barrier	Incubation, Acceleration and Services	1	Unclear steps to take
Spin Off	Enabler	Environment for Scientists	6	part time scientist
Researcher	Barrier	Incubation, Acceleration and Services	1	No best practice available
Researcher	Barrier	Incubation, Acceleration and Services	2	TTO
Researcher	Barrier	Incubation, Acceleration and Services	3	Support in company creation
Spin Off	Enabler	IP and Patent Process	8	Ip transfer
Spin Off	Enabler	IP and Patent Process	8	own patent
Spin Off	Barrier	IP and Patent Process	8	semiprofessional experience
Researcher	Barrier	Entrepreneurial education	6	No Entrepreneurial education
Spin Off	Barrier	Entrepreneurial education	9	poor entrepreneurial knowledge
Spin Off	Enabler	Mindset and motivation	9	Own interest
Spin Off	Enabler	Partnerships and cooperations	10	After 2 years first projects
Researcher	Barrier	Incubation, Acceleration and Services	14	Selection right funding difficult
Spin Off	Barrier	Incubation, Acceleration and Services	4	Funding landscape
Spin Off	Barrier	Incubation, Acceleration and Services	4	No incubator or accelerator