

University-industry collaboration and its effects on innovative thinking among students

Master Thesis

MASTER DEGREE PROJECT - MSc INNOVATION AND INDUSTRIAL
MANAGEMENT

Department of Innovation & Entrepreneurship

MASTER DEGREE PROJECT - MSc MANAGEMENT - MAJOR:
ENTREPRENEURSHIP AND INNOVATION

Department of Business & Management

GRADUATE SCHOOL

Supervisor

PhD Daniel LJUNGBERG

University of Gothenburg

Supervisor

PhD Maria Isabella LEONE

LUISS Guido Carli

Co-Supervisor

PhD Enzo PERUFFO

LUISS Guido Carli

Written by

Author Svenja Nadine HALLER

Handed in June 7, 2020

Academic year 2019/2020

Abstract

Due to the pressure for industry to constantly innovate to keep the leading edge, companies are more and more pursuing external sources of innovation to speed up the innovation process. University–industry collaboration, which is later referred to as UIC, enables open innovation, co-creation and the collective creation of knowledge. Hence, it is an attractive opportunity for both university and industry. UIC can create value by improving innovativeness, but the potential for innovation due to the direct collaboration between industry and students has not been investigated thoroughly so far. This research project aimed at filling the research gap about industry student collaboration by increasing the understanding of the value that the involvement of students in UIC could create and by investigating if students' innovative thinking develops due to the interaction with industry and hence can complement co-innovation processes in the future. The research project has been conducted through a qualitative cross-sectional study. To get a more universal overview of UIC, interviews were conducted in Sweden and the USA. Findings indicate that UIC creates value for university, students, and industry. Especially for students, there is more value created and also industry can benefit from additional value created. Students get real-life experience and project-based learning, which leads to a richer learning experience. Furthermore, collaboration with industry improves employment opportunities for students. Students can use UIC to build their network. Regarding industry, there can be a positive impact on a company's reputation. Moreover, students bring in a fresh perspective, reflection, inspiration, energy and enthusiasm. The students also dare to question the status quo and make the companies rethink how things are done. Through the collaboration companies get access to new knowledge and innovation tools. Collaborating with students can also help companies to prepare for the future. Furthermore, industry student collaboration has a positive effect on innovative thinking among students. The research project showed that innovative thinking can be learned, and that industry student collaboration can help to develop it. Participating in an education program that combines theory and practical experience or founding a student start-up can be used to develop innovative thinking.

Keywords: innovation, innovative thinking, university-industry collaboration, types of university-industry collaboration, industry student collaboration, knowledge transfer, real-world experience students

Acknowledgements

First of all, I want to express my sincere gratitude to everyone that contributed to and helped me with this research project.

I want to thank all the participants who took their time to participate in the interviews and especially Per Östling from First to Know who connected me with a lot of interesting and inspiring people.

In addition, I want to express my sincerest gratitude to the Sten A Olsson Foundation for granting me the scholarship, which allowed me to do my research trip to California.

Furthermore, I would like to thank my supervisor Daniel Ljungberg for always being available for support, feedback, and inspiration. I also would like to thank Isabella Leone for her feedback and guidance through the thesis process.

Contents

List of figures	vi
List of tables	vi
List of abbreviations	vi
1. Introduction	1
1.1. Research gap	2
1.2. Purpose and research questions	3
1.3. Research background	3
1.4. Thesis disposition	4
2. Literature review	5
2.1. Innovative thinking	5
2.1.1. Definition innovation	5
2.1.2. Definition innovative thinking	7
2.1.3. Influencing factors of innovative thinking and innovation	9
2.2. University-industry collaboration	11
2.2.1. Definition UIC	11
2.2.2. Types of UIC	12
2.3. Value created by UIC	14
2.3.1. Value generated for university	14
2.3.2. Value generated for students	17
2.3.3. Value generated for industry	19
2.3.4. Influencing factors of UIC	23
2.4. Summarizing chapter to unite UIC and innovative thinking	28
3. Methodology	31
3.1. Research design	31
3.2. Research strategy	32
3.3. Data collection	33
3.3.1. Secondary data	33
3.3.2. Primary data	33
3.4. Data analysis	36
3.5. Research quality	38

4. Analysis	40
4.1. Pre-study	42
4.2. Value created by UIC	44
4.2.1. Value generated for university	44
4.2.2. Value generated for students	46
4.2.3. Value generated for industry	52
4.2.4. Influencing factors of UIC	59
4.2.4.1. Influence of a facilitator - First to Know	64
4.3. Effects of UIC on innovative thinking of students	67
5. Discussion	80
5.1. Value created by UIC	80
5.1.1. Value generated for university	80
5.1.2. Value generated for students	81
5.1.3. Value generated for industry	84
5.1.4. Influencing factors of UIC	86
5.2. Effects of UIC on innovative thinking of students	90
6. Conclusion	100
6.1. Connection to the research questions	100
6.2. Theoretical implications	103
6.3. Practical implications	104
6.3.1. University	104
6.3.2. Students	104
6.3.3. Industry	104
6.3.4. First to Know	104
6.4. Limitations	105
6.5. Future research	105
Bibliography	105
A. Appendix: Organizational forms of UIC	111
B. Appendix: Summary literature review	112
C. Appendix: Nvivo codes overview	115
D. Appendix: Example interview guide (interview with L1)	129
E. Appendix: Interview transcripts	131

List of figures

2.1. A diagrammatic definition of innovation (Source: Baregheh, Rowley, and Sambrook, 2009).	6
2.2. Building the ability to innovate (Source: Hill et al., 2014).	8
2.3. Building the willingness to innovate (Source: Hill et al., 2014).	10
2.4. The “trading zone” framework: technology entrepreneurship education through university–industry collaboration (Source: Nakagawa et al., 2017).	13
2.5. Framework.	29
4.1. Overview analysis.	79
5.1. Framework of research findings.	98

List of tables

3.1. Perspectives of the respondents	36
3.2. Details about the respondents	37

List of abbreviations

UCI	University of California, Irvine
UIC	University-industry collaboration
UIIN	University industry innovation network

1. Introduction

Interest in innovation, its processes and its management has increased tremendously over time. Rapid change and technological advancements force companies to constantly look for innovation in order to meet changing customer demands and lifestyles. Innovation is an important tool for creating value and sustaining competitive advantage (Baregheh, Rowley, and Sambrook, 2009). Moreover, innovation has to be promoted in order to build and keep a competitive position (ibid.). Innovation and innovation management are two important aspects of an organization's strategy. Due to the pressure for industry to constantly innovate to keep the leading edge, companies are more and more pursuing external sources of innovation to speed up the innovation process (Huhtelin and Nenonen, 2015).

University–industry collaboration, which is later referred to as UIC, enables open innovation, co-creation, and the collective creation of knowledge (ibid.). Hence, it is an attractive opportunity for both university and industry. Universities are an attractive partner with well-educated researchers and also students who are the future employees for the companies (J. Lee and Win, 2004). As stated before, companies are faced with fast technological advancements and shorter product life cycles. Collaborating could be an innovative move for companies to remain in a leading position.

University and industry have recognized the value that UIC can create, as can be seen from the increasing number of university-industry collaborations in the last few years (Ankrah and Al-Tabbaa, 2015). According to the “The Global Competitiveness Report 2017–2018” written by the World Economic Forum, UIC in research & development is quite common in Sweden and the USA (Schwab, 2020). The amount of UICs in these two countries is considerably higher than the world median (ibid.). The USA has a slightly higher index than Sweden, indicating that university-industry collaboration is a bit more popular in the USA than in Sweden. Furthermore, the authors of the “The Global Competitiveness Report 2017–2018” used UIC in research & development as a determinant of a country's innovativeness (ibid.). This is another indicator that university and industry can use UIC to improve their innovativeness. To keep their leading edge, companies require knowledge that they do not have themselves (Huhtelin and Nenonen, 2015). Furthermore, they need to know about new trends in research to know which technologies are rising and they need to have new talents (ibid.). In addition, UIC is not only an important topic for industry, but also for university. Universities need the industry perspective and resources for research (ibid.). The following current example shows the value that UIC can create. The University Industry Innovation Network (UIIN) is a network of academics, practitioners and business professionals that intend to drive university-industry interaction, entrepreneurial universities and collaborative innovation (University Industry Innovation Network, 2020). This

1. Introduction

year they organized the first UIIN online conference due to the COVID-19 pandemic. According to the University Industry Innovation Network (2020), “in a social-distancing and lock down world, university-industry engagement has become more important than ever before. Universities play a crucial role in addressing today’s crisis, re-invent their business models, accelerate the road to online and blended learning and accelerate their engagement processes”.

However, it could be beneficial to not only look where university and industry already interact, but also to look at where they do not interact yet to find further potential for value creation. By looking at the common UICs, it becomes clear that there are unexploited possibilities for further collaborations. Universities are not seen any more as just an institution for teaching and research. They are also considered a place that facilitates multidisciplinary interaction between students, researchers and entrepreneurs that can exchange their diverse perspectives on topics and inspire each other (Huhtelin and Nenonen, 2015). The area of UIC involving students is still rather unexplored in research, because the majority of UIC is conducted on a higher level, between researcher and company or through science parks. However, students are not only future employees for the companies, as mentioned before, but they could also create value for industry before graduating through collaboration. There are some forms of collaboration between industry and students, for example internships, which may enable industry and students to connect and collaborate. These forms of collaboration can create value by increasing employability and solving problems for industry. Students could offer, for example, a fresh perspective and provide new insights for companies on innovation topics. Given the fact that for many industries innovation is one of the main factors for keeping a competitive edge, industry student collaboration could be an innovative approach for new developments. In addition, this collaboration can also yield value for students, because students can gain industry insights and practical experience.

As mentioned before, UIC can create value by improving innovativeness, but the potential for innovation due to collaboration between industry and students has not been investigated thoroughly so far. UIC in general seems to create value for university and industry and it would be interesting to investigate if this value could be increased further by extending UIC to the student level. Furthermore, it would be interesting to investigate if increased innovativeness is part of that created value. Therefore, the value created for university, students and industry, when students are involved in UIC, will be examined. In a next step, it is relevant to examine not only what value collaboration with industry creates for students, but also what effect it has on students’ innovative thinking in order to close the circle and connecting back to the initial argument that UIC improves innovativeness.

1.1. Research gap

Barnes, Pashby, and Gibbons (2002) claimed that the role of students regarding UIC has been neglected in the literature, although it would be in the interest of universities and industry to include students in UIC. Over a decade later, Huhtelin and Nenonen (2015) study about mul-

1. Introduction

interdisciplinary collaboration between students and industry showed that this topic is still barely explored yet. Two complementary problems, which universities and industry face could be solved by involving students (Nakagawa et al., 2017). While industry faces difficulties when trying to access theoretical knowledge, university students struggle to get practical experience (ibid.). When students and industry would collaborate, industry could get theoretical insights from the students and students could get experiential know-how from industry (ibid.). Nevertheless, as mentioned before, research about the involvement of students in UIC is still scarce and no clear frameworks and processes to encourage it can be offered at this time (ibid.). Furthermore, Nakagawa et al. (2017) also claim that there is little literature about the investigation about the effect that the knowledge exchange created by UIC has on the students, especially regarding the effect on their innovative thinking.

I made the same observations as the aforementioned researchers. The reviewed literature about UIC shows that the research about this topic is mostly about UIC on the level of researchers and the value it creates. The literature about UIC was reviewed to reveal the existing research gap about the collaboration between students and industry. The literature about UIC and the value it creates was used as an entry point in order to be able to deep dive into the subject of collaboration between industry and students in a next step using the collected primary data.

1.2. Purpose and research questions

The topic of industry student collaboration is relevant to investigate, because one can observe the industry's need to innovate in order to stay competitive and their increasing interest in external sources of innovation to do so. Students could be the key for that, and the interaction would also be beneficial for students, because they could get practical experience and insights. This research project is aimed at filling the research gap about industry student collaboration. The research results will increase the understanding of the value that the involvement of students in UIC could create. Furthermore, the research results will help to determine if the innovative thinking of students develops due to the interaction with industry and hence can complement co-innovation processes in the future. All in all, the aforementioned considerations were summarized in the following research question to examine them:

RQ1: What value does university-industry collaboration create when students are involved?

RQ2: What are the effects of university-industry collaboration on innovative thinking among students?

1.3. Research background

The research project was conducted in cooperation with the company First to Know Scandinavia AB. First to Know was initiated in 2014 by Ola Ekman and Per Östling. Their objective is to create a more innovative and sustainable society. Both founders have been working with industry

1. Introduction

and university and have experience with involving students in projects with industry and public organizations. They established the collaboration platform called “The()Space” to connect different actors in society to drive innovation. The goal is to bridge the gap between different actors from university, industry and government. The ()Space platform intends to close this gap by connecting these different actors so that they can share knowledge, develop and grow new ideas, concepts and innovations. First to Know has connections to the University of Gothenburg and Chalmers, the technical university in Gothenburg. Therefore, they can involve students from various academic disciplines. Furthermore, they have various partner companies in industry. In the beginning of 2020, they opened the 360 Space, an innovation hub, where students from multiple disciplines and start-ups work together. Moreover, various guest speakers are invited to inspire the students and also to get inspired by the students. In the end of 2019, it was agreed to do this research project together to investigate what value UIC creates when students are involved, the effect that UIC has on innovative thinking among students and what First to Know does to contribute to that and what they could do additionally.

Moreover, in order to get a more universal overview of UIC, interviews were not only conducted in Sweden, but also in California, which is known for its innovative companies and universities. The research trip to the USA took place in March 2020 to investigate UIC in California. Interviews were conducted at the University of California, Irvine, later referred to as UCI, and in San Francisco.

1.4. Thesis disposition

In the following, the reviewed literature will be discussed. The literature review’s structure was aligned with the research questions. The intent was to define all important concepts for answering the research questions. Furthermore, to better understand the different perspectives of the parties involved, there will be a closer examination of the value created for university, students, and industry. Furthermore, the influencing factors will be addressed. In the end, of the literature review there will be a summarizing chapter to bring together UIC and innovative thinking of students. The proposed framework is based on the reviewed literature and the research questions. In a next step, the methodology of the research project will be explained. After that, the analysis chapter will follow with the results from the pre-study and the main research project. The structure will be kept close to the structure of the literature review to have a clear overall structure, which allows a comparison between data collected from the literature and from the interviews in the discussion part. The analysis chapter will be followed by the discussion chapter to compare and discuss the reviewed literature and the collected primary data. In the last chapter, a conclusion will be drawn, and theoretical and practical implications will be outlined. Furthermore, the limitations of this research project will be pointed out and a recommendation for future research will be given.

2. Literature review

In the following chapter, the literature about innovation and UIC, which is relevant to answer the research question, will be highlighted. The literature review starts by giving a general perspective on innovation and innovative thinking, before explaining the collaboration between university and industry and the value it creates, in greater detail. The literature about innovation will be reviewed first because innovation is a large field and UIC is just a part of it.

2.1. Innovative thinking

In this section innovative thinking will be defined. First, innovation will be looked at, because innovative thinking is a part of innovation. After that, the influencing factors of innovation and also innovative thinking will be highlighted to get a clear overall picture of innovation and innovative thinking.

2.1.1. Definition innovation

Innovation and innovation management are key aspects of strategy planning and relevant for both universities and industry across different disciplines (Baregheh, Rowley, and Sambrook, 2009). But in order to manage innovation one has to understand what innovation is. Innovation is a concept that has many different definitions depending on the different disciplines that are using it (Baregheh, Rowley, and Sambrook, 2009). An early and still cited definition of innovation is the following: “Innovation is the generation, acceptance and implementation of new ideas, processes products or services.” (Thompson, 1965, p.2). Whereas, Drucker (2002) goes one step further and defines innovation as the “effort to create purposeful, focused change in an enterprise’s economic or social potential” (p.2). Lundvall (2007) agrees by stating that innovation is necessary for progress. To innovate it is essential to understand knowledge and learning because otherwise it is difficult to be innovative (Lundvall, 2007). Drucker (2002) gives a practical example and states that innovation as a discipline is not just a concept, but it is essential to build up the concept with knowledge from the market. Furthermore, Lundvall (2007) claims that knowledge creation and innovation require interaction between actors with different backgrounds and experiences. This might be the reason why it becomes more common for organizations to explore external sources of innovation (Perkmann and Walsh, 2007). These newer, external sources of innovation are more characterized by interaction and collaboration. Chesbrough (2003) coined the concept of “open innovation”, which implies that R&D departments become more open and make their research available to external parties (ibid.). Another

2. Literature review

new concept is crowd sourcing of innovation (Boudreau and Lakhani, 2013). It becomes more common for organizations to use the help of external groups to solve innovation problems or questions (ibid.). Huhtelin and Nenonen (2015) state that UIC shows the need for knowledge co-creation.

Baregheh, Rowley, and Sambrook (2009) conducted a comprehensive content analysis to find a generic, integrative definition of innovation, which is valid for different disciplines. They looked at 60 different definitions of innovation from different disciplines and designed a typology of innovation to be able to classify it (ibid.). Although Baregheh, Rowley, and Sambrook (2009) found some overlap between the vast amount of definitions of innovation, the definitions are still very diverse and there is no unique and dominant definition of innovation. Therefore, they identified attributes from the analyzed innovation definitions to use it as a foundation for their integrative innovation definition (ibid.). These attributes are the following: Nature of innovation (new or incremental), type of innovation (type of output of innovation), stages of innovation, social context, means of innovation (necessary resources) and aim of innovation (ibid.). To visualize their results, Baregheh, Rowley, and Sambrook (2009) designed a graphical representation of this diagrammatic definition of innovation (see Fig. 2.1). In Figure 2.1, one can see the most commonly used attributes to define innovation and descriptors to better understand the mentioned attributes (Baregheh, Rowley, and Sambrook, 2009). The attributes are of equal importance and the suggested flow is not definitive and does not have to be linear (ibid.). Any of the six attributes can be a starting point of the innovation process and the selection might depend on the respective discipline (ibid.). Nevertheless, Baregheh, Rowley, and Sambrook (2009) utter the assumption that the starting point selection and the way innovation is or is not achieved could be strongly related.

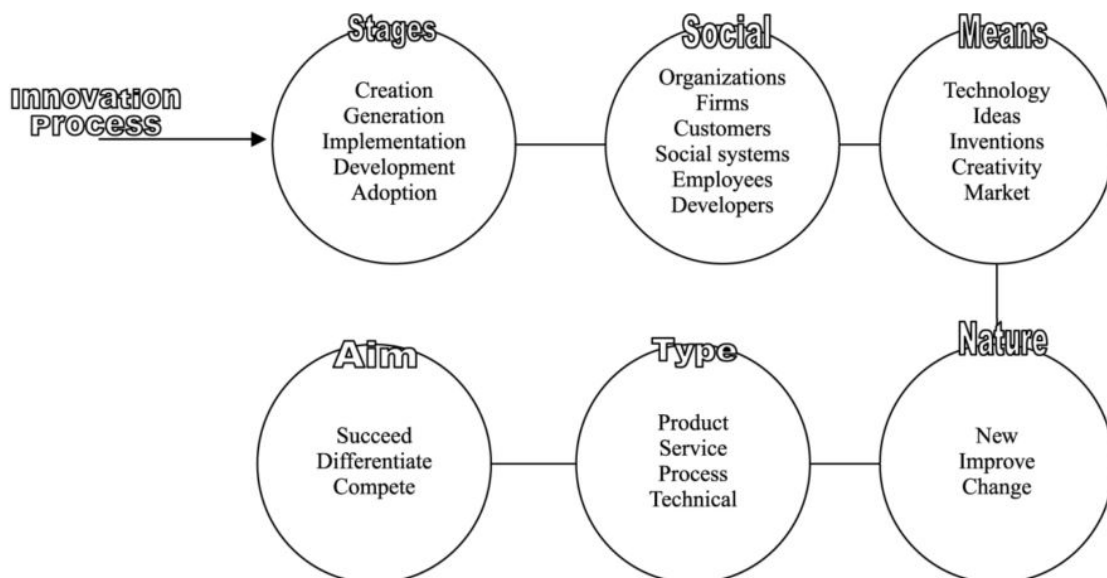


Figure 2.1.: A diagrammatic definition of innovation (Source: Baregheh, Rowley, and Sambrook, 2009).

2. Literature review

Based on their analysis and incorporating the previously mentioned attributes, Baregheh, Rowley, and Sambrook (2009) give the following comprehensive definition of innovation. Innovation is “the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.” (Baregheh, Rowley, and Sambrook, 2009, p. 1334). Baregheh, Rowley, and Sambrook (2009) argue that it is essential to have an integrative definition in order to give a clear meaning and shared understanding of innovation. Then a base can be build, that allows knowledge sharing regarding innovation and that overcomes the barriers between different disciplines (ibid.). Furthermore, a generally accepted definition of innovation would make it easier to identify and classify different kinds of innovation and to compare them across organizations and countries (ibid.).

All in all, Baregheh, Rowley, and Sambrook (2009) offer a generic, integrative definition of innovation that is valid for different disciplines. It is important for a definition of innovation to include the following attributes. Stages, social, means, nature, type, and aim. Nevertheless, Baregheh, Rowley, and Sambrook (2009) do not explicitly mention external sources of innovation in their research like the concept of “open innovation” and “crowd sourcing”. But one could assume that external sources of innovation might fall under the attribute “means of innovation”, which deals with the required resources to achieve innovation.

2.1.2. Definition innovative thinking

Innovative thinking consists of two parts. The willingness and the ability to innovate, which will be explained in the following.

Hill et al. (2014) state that the willingness to innovate is an important first step for becoming innovative. The majority of innovations are not serendipitous and therefore require a conscious, purposeful search for opportunities to innovate (Drucker, 2002). Hence, successful innovators have to be committed to the systematic practice of innovation (ibid.). Furthermore, Nakagawa et al. (2017) agree that innovators require a way of thinking that aims at the realization of opportunity, rather than the risk-averting decision making common in hierarchical organizations.

However, it is also crucial to build the ability to innovate according to Hill et al. (2014). Hill et al. (2014) and Chen et al. (2013) use different terms, but ability to innovate and innovation capability describe the same concept. Chen et al. (2013) define innovation capability as the “ability that a person (innovation subject) is able to get novel achievements through some activities in an ideal environment” (p.1199). Furthermore, they state that innovation capability is about how a person solves a problem (ibid.). They claim that innovation capability is about the awareness on how something can be improved and what aspects could lead to difficulties and to find creative solutions (ibid.). Chen et al. (2013) emphasize the importance of creativity for innovation capability. The challenging and changing of existing thinking patterns and the development of creative thinking (ibid.). Hill et al. (2014) also emphasize the importance of creative thinking for being able to innovate, but they specify it more clearly. They suggest to build three capabilities, which can be observed in Figure 2.2 (ibid.). Creative abrasion, creative

2. Literature review

agility, and creative resolution (ibid.). As it can be observed in Figure 2.2, creative abrasion is the ability to generate ideas through interaction; creative agility is the ability to test and experiment; and creative resolution is the ability to make decisions that combine diverse and maybe even conflicting ideas (ibid.). All these capabilities are necessary for being able or capable to innovate, which in turn is required for innovative thinking.

In addition, Ness (2015) argues that innovative thinking means breaking frames. Frames are expectation structures and assumptions that we use to process new information, which is useful. Nevertheless, frames are often the sources of cognitive biases (ibid.). Nonaka and Takeuchi (1995) also state that it is important to question everything, especially what you take for granted (p.23). All in all, based on the reviewed literature, innovative thinking is about continuously looking for innovation opportunities. It is about finding new ways of thought and looking at current situations differently. Furthermore, it is not only about willingness to innovate, but also about being able or capable to innovate. To have the necessary way of thought, to challenge and change existing thinking patterns and to develop creative thinking and capabilities related to creativity.

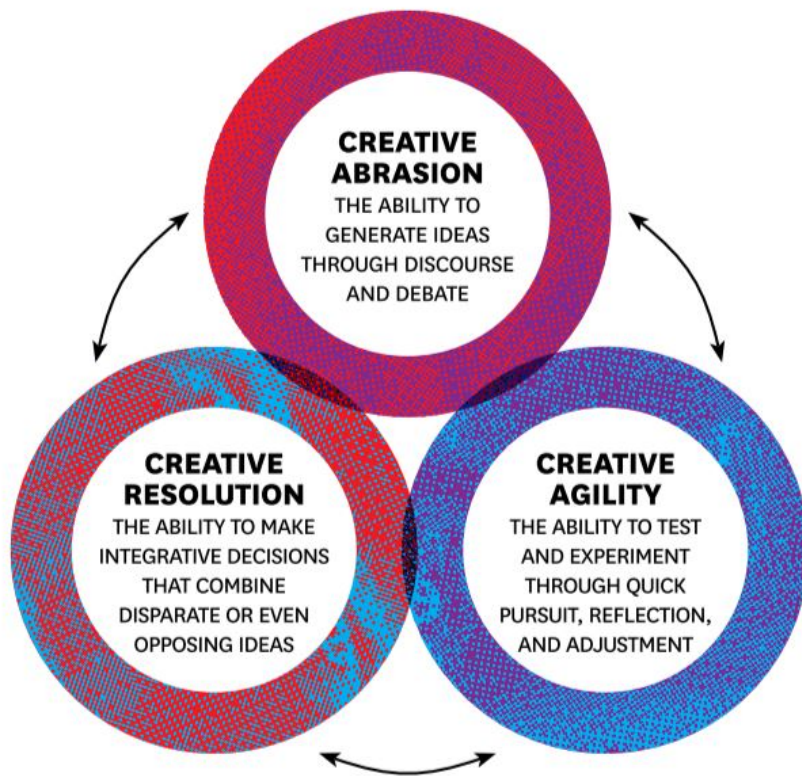


Figure 2.2.: Building the ability to innovate (Source: Hill et al., 2014).

2.1.3. Influencing factors of innovative thinking and innovation

In the following, the literature about the factors, which influence innovation and also innovative thinking, will be highlighted.

First of all, learning and training are factors that can support the development of innovative thinking. Chen et al. (2013) claim that students require training to build their innovation capability, which is part of innovative thinking. Training can help students to become more aware of improvement potential, problems that could occur and their associative ability (ibid.). In addition, training can help students to question existing thinking patterns and to develop comprehensive divergent thinking (ibid.). Birdi, Leach, and Magadley (2016) also recommend offering tailored training to improve innovativeness by improving individuals' innovation capabilities. Nevertheless, Gupta (2011) argues that traditional didactic classroom models are mostly about providing students with information that they passively absorb and just memorize it to pass an examination. Therefore, Franco and DeLuca (2019) promote an active learning approach through constructivism to foster critical thinking and problem solving among students. Constructivism is about helping the students to develop their own solution to a problem instead of guiding them to a solution (Dagar and Yadav, 2016). Furthermore, a constructivist educational approach teaches students to look for solutions outside confined and compartmentalized formats (Franco and DeLuca, 2019). Hill et al. (2014) agree and state that if a new and unique approach is necessary to solve a problem, no one can decide beforehand how this solution looks like. Furthermore, as mentioned before, the ability to innovate is part of innovative thinking. To build the ability to innovate one has to create the willingness to innovate (ibid.). Therefore, Hill et al. (2014) recommend to encourage collaboration by building communities. For these communities to work it is necessary to have a sense of purpose, common values and rules to guide the collaboration (ibid.). A graphical representation of how to build this "sense of community" can be seen in Figure 2.3.

In consequence, collaboration can lead to discovery-driven learning and integrative decision making (ibid.). Moreover, the collaboration of diverse people usually leads to innovation because various ideas are created that are discussed and further developed (ibid.). Cummings and Bridgman (2016) also state that diversity is positively related to idea generation, problem solving and hence innovation. These discussions and maybe even conflicts due to clashing ideas are therefore required to be innovative even though often organizations try to minimize conflict (Hill et al., 2014). Leaders should try to manage friction and encourage the free flow of ideas and the discussion of ideas because that is what innovation thrives on (ibid.). To make this happen, it is essential to identify and develop innovation leaders that are able to nurture both individual and collective innovativeness (ibid.). These innovation leaders have to create the context in which innovation can happen (ibid.). Birdi, Leach, and Magadley (2016), for example, found that departmental support for innovation is related to employees' idea generation. Kim, Park, and Paik (2018) state that leadership has an influence on innovation and can nurture innovation capability. Elenkov and Manev (2005) also found positive and significant effects of leadership on innovation. Kim, Park, and Paik (2018) emphasize how important it is that leaders promote

2. Literature review

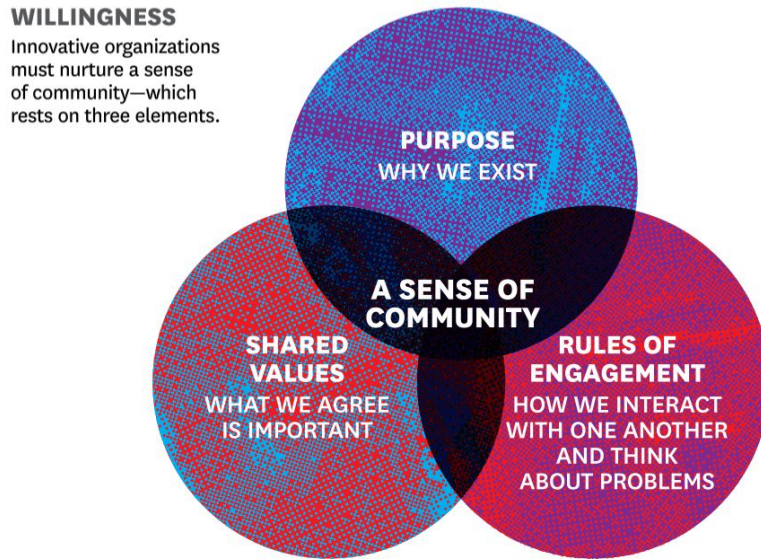


Figure 2.3.: Building the willingness to innovate (Source: Hill et al., 2014).

a culture of innovation because they found that culture has an important impact on the level of innovation. If the culture is rigid it has a negative impact on innovation because there is no spontaneous participation in activities and no open communication, but these are prerequisites for creativity and innovation (ibid.). Moreover, organizational rigidity and insufficient resources can hinder the innovation capability (Kim, Park, and Paik, 2018). However, Chen et al. (2013) also argue that it is important for a person to be able to comply with or transform the environment in order to be capable of innovation. Furthermore, the organizational climate can stimulate innovative thinking (Merx-Chermin and Nijhof, 2005). It is important to create an atmosphere of trust, open-mindedness, and commitment (ibid.). In addition, Merx-Chermin and Nijhof (2005) claim that creativity is important for innovation, as stated before. Nevertheless, according to them individual creativity is not enough. Hence, creativity has to be managed as a collective process to increase the innovation potential (ibid.).

All in all, critical thinking and problem-solving skills seem to be important for innovative thinking (Dagar and Yadav, 2016; Franco and DeLuca, 2019). These skills can be learned (Birdi, Leach, and Magadley, 2016; Chen et al., 2013; Franco and DeLuca, 2019). Furthermore, innovation leaders play an important role for the development of innovative thinking. An innovation leader has to build the willingness to innovate, before the ability to innovate can be learned (Hill et al., 2014). In addition, diversity has a positive influence on innovation (Cummings and Bridgman, 2016). Moreover, culture and the organizational climate can stimulate innovative thinking (Kim, Park, and Paik, 2018; Merx-Chermin and Nijhof, 2005). Therefore, leadership is also important for innovative thinking (Elenkov and Manev, 2005; Kim, Park, and Paik, 2018).

2.2. University-industry collaboration

In the following, UIC will be defined to give a clear overview. In a next step, the different types of UIC will be outlined, to make UIC more tangible.

2.2.1. Definition UIC

Etzkowitz and Leydesdorff (2000) describe the relation of university, industry, and government as a triple helix. They claim with their Triple Helix thesis that universities, industry, and government are connected and should collaborate to nurture innovation and economic progress (Etzkowitz and Leydesdorff, 2000). An innovation and learning perspective are important for economic policy. Nevertheless, policy makers should keep in mind that the role of universities is not just to provide immediate innovation, but also to educate future knowledge workers (Lundvall, 2007). According to Lundvall (2007) universities are part of a national system of innovation. The system approach is based on the idea that the interrelationships and interaction between elements of the system are crucial for the result, in this case innovation (Lundvall, 2007). Since both universities and companies are part of the system, interaction between these two actors is important for innovation. Furthermore, the government is important for the collaboration success by providing resources like assistance and funding (J. Lee and Win, 2004). Moreover, the universities' role was seen as connecting economic with societal changes so far (J. Lee and Win, 2004), but Ankrah and Al-Tabbaa (2015) state that the increasing number of universities collaborating with companies changes the role of universities.

This was a more holistic approach to understand UIC. To be more concrete one can define UIC as the cooperation of universities with companies to promote knowledge and technology exchange (Bekkers and Freitas, 2008; Siegel, D. Waldman, and A. Link, 2003). The exchange of knowledge can be described as the “common denominator”, which incites university and industry to collaborate (Meyer-Krahmer and Schmoch, 1998, p. 842). Furthermore, Ankrah and Al-Tabbaa (2015) emphasize the bidirectional exchange of knowledge. This is one of the main differences to for example contract research. In case of contract research, universities and industry do not collaborate, but the knowledge flow is one directional coming from universities to the industry to achieve the commercialization of a technology (Meyer-Krahmer and Schmoch, 1998). Jacob et al. (2000) agree with that by claiming that university industry relationships in the past were characterized by “sponsorship” rather than “partnership”. The emergence of today's knowledge-based economy changed the relationships' dynamics from “sponsorship” to “partnership”, with ongoing interaction as the main focus (Jacob et al., 2000).

All in all, the relation between university, industry and government can be seen as a triple helix (Etzkowitz and Leydesdorff, 2000). More concrete UIC can be defined as the cooperation between universities with companies to promote knowledge and technology exchange (Bekkers and Freitas, 2008; Siegel, D. Waldman, and A. Link, 2003). UIC became more about the bidirectional exchange of knowledge and partnership instead of sponsorship (Ankrah and Al-Tabbaa, 2015; Jacob et al., 2000).

2.2.2. Types of UIC

First of all, UIC can either be seen as a rational or irrational process (Ankrah and Al-Tabbaa, 2015). A rational UIC process has a focus on planned resource and knowledge transfer, whereas an irrational UIC process is about creating knowledge by informally interacting with each other (ibid.). The rational view is more commonly used in the literature about UIC (ibid.). In order to investigate UIC types in more depth Ankrah and Al-Tabbaa (2015) conducted a systematic review of UIC. They discovered that there are many different typologies of UIC (ibid.). For their research, they used the framework proposed by Bonaccorsi and Piccaluga (1994) and extended it. This extended typology is used to identify the relevant organizational forms of UIC, to investigate the research questions. This choice was made because this extended framework is widespread, comprehensive and includes organizational forms of UIC with students (Ankrah and Al-Tabbaa, 2015; Bonaccorsi and Piccaluga, 1994). The typology consists of the following forms: “Personal Informal Relationships”, “Personal Formal Relationships”, “Third Party”, “Formal Targeted Agreements”, “Formal Non-Targeted Agreements” and “Focused Structures” (see Appendix Table A.1) (Ankrah and Al-Tabbaa, 2015; Bonaccorsi and Piccaluga, 1994).

The most relevant type for this research project are “Personal Formal Relationships” since this type includes “Student internships and sandwich courses”, “Students’ involvement in industrial projects”, “Scholarships, Studentships, Fellowships and postgraduate linkages”, “Joint supervision of PhDs and Masters theses” and “Hiring of graduate students” (Ankrah and Al-Tabbaa, 2015). Sandwich courses are university courses, which include work periods in between the study periods to give students the chance to get practical experience. The different organizational forms of UIC are ranked according to their increasing level of organizational involvement, which has three different aspects (Ankrah and Al-Tabbaa, 2015). Organizational resource involvement from the university, length of the agreement and degree of formalization (ibid.). This ranking means that “Personal Formal Relationships” are forms of UIC that involve organizational resource involvement, but it is relatively low (ibid.). The length of the collaboration for “Personal Formal Relationships” is short (ibid.). Another aspect is the formalization of the agreement. The formalization is rather low for “Personal Formal Relationships” (Bonaccorsi and Piccaluga, 1994). Although, Bonaccorsi and Piccaluga (1994) claim that formalization of an agreement is a crucial aspect because it has an influence on the success of the collaboration, Ring and Van de Ven (1994) claim that an increasing formalization and monitoring of a collaboration can be the source of conflict and loss of trust among the collaboration partners, if they fear to lose their autonomy.

Furthermore, Nakagawa et al. (2017) introduced a new framework about UIC based on their research. The framework is kind of related to the UIC types presented in the “Formal Targeted Agreements” category mentioned before, but it is more advanced than the forms presented in that category and it could be added as a new category to the overview. Nakagawa et al. (2017)’s proposed framework is graphically represented in Figure 2.4. They developed this analytical framework using the metaphor of a “trading zone” to help the exchange of knowledge between parties when implementing an university-industry collaborative education program (Nakagawa

2. Literature review

et al., 2017). According to them, university-industry collaborative education would help to combine theoretical insights from universities and experiential know-how from industry and especially offer students practical experience (ibid.). The idea of a university-industry collaborative education program is to provide a shared language to make the knowledge exchange faster and more efficient given the extraordinary and temporary conditions of a university-industry collaborative education program (ibid.). This framework recognizes the diversity between participants from university and industry as an advantage and uses an university-industry coordinator to mediate and facilitate the interaction between those diverse participants (ibid.). It is important to create a feeling of freedom and an appreciation for this extraordinary context (ibid.). The temporary trading zone should feel safe and risk-free (ibid.). Nakagawa et al. (2017)'s analysis shows that each participant transacts with his own interests, but the result is improved knowledge for everyone.

All in all, reviewing the different organizational forms of UIC, given in the literature, one can see that collaboration between industry and students in particular was looked at, but it was not the main focus. Nakagawa et al. (2017) recently provided a study that focused on the collaboration with students. Although Nakagawa et al. (2017)'s findings are limited in terms of external validity because the study was limited to one education program in Japan, their study provided a new perspective on UIC and their results can be tested in future research.

A University–Industry Collaborative Entrepreneurship Education Program

Koichi Nakagawa, Megumi Takata, Kosuke Kato, Terumasa Matsuyuki, and Toshihiko Matsuhashi

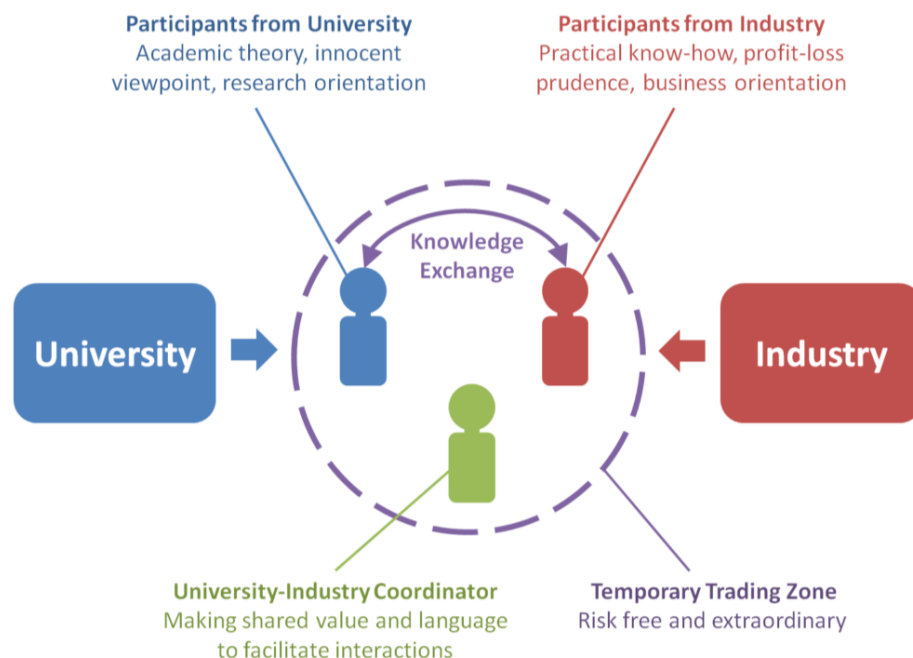


Figure 2.4.: The “trading zone” framework: technology entrepreneurship education through university–industry collaboration (Source: Nakagawa et al., 2017).

2.3. Value created by UIC

As stated before, university, industry and government are connected through a triple helix and should collaborate to nurture innovation and economic progress (Etzkowitz and Leydesdorff, 2000). Barnes, Pashby, and Gibbons (2002) agree with that by claiming that governments encourage UIC to increase a countries' competitiveness and economic wealth. Ankrah and Al-Tabbaa (2015) also emphasize the contribution of UIC to local and regional economic development and possibly the service to the community. By contrast, Hagen (2002) is very skeptical and doubts that UIC is the key to economic regeneration and states that the direct causal link between universities and economic regeneration is controversial. She does not doubt potential benefits exemplified in the Triple Helix thesis, but she claims that the implementation of a successful collaboration is very difficult and has not been sufficiently considered in the equation (ibid.).

Salter and Martin (2001) claim that there exists a very significant relationship between publicly funded basic research and economic performance. There are not only spillover benefits for companies, which are located near research centers and universities, but there are also broader impacts like knowledge flows and well-skilled students (ibid.). Based on his research results, Y. S. Lee (2000) conclude that motivation for participating in UIC are closely related to the subsequently realized benefits due to UIC. Nevertheless, Ankrah and Al-Tabbaa (2015) argued based on their research that not all benefits could be captured by the previously established motivations. Therefore, motivations and benefits for UIC will be summarized under the term "value". Motivations and benefits are both included to create a comprehensive overview. The value created by UIC will be explored further in the following sub chapters.

2.3.1. Value generated for university

As stated before, governments encourage UIC and provide universities with additional public funding and universities also receive private funding due to the collaboration with industry (Barnes, Pashby, and Gibbons, 2002). Ankrah and Al-Tabbaa (2015) also argue that UIC creates value by providing public and private sources of revenue. Hagen (2002) states that universities are pressured to grow new knowledge and are forced to raise funding. According to her, raising funding is the reason why universities seek relationships with industry in order to remain at the leading edge in all subject areas (ibid.). Similarly, Meyer-Krahmer and Schmoch (1998) found that additional funds are the most common reason for UIC, but knowledge exchange is in second position. Nevertheless, their respondents gave almost the same relevance index to both benefits (ibid.). Receiving funding for collaboration can be seen as a positive development because academic researchers prefer collaborative research distinctly over contract research (Meyer-Krahmer and Schmoch, 1998). Collaborative research seems to be preferred because it implies a bi-directional, or mutual, exchange of knowledge, whereas contract research is primarily a one-directional knowledge flow from university to industry (Meyer-Krahmer and Schmoch, 1998; Siegel, D. A. Waldman, et al., 2004).

2. Literature review

Furthermore, universities can earn a further income through licenses and patents created by UIC (Ankrah and Al-Tabbaa (2015); Meyer-Krahmer and Schmoch, 1998). By contrast, Y. S. Lee (2000) and Becker and Eube (2018) argue that the commercialization of research results is not the main focus for universities. Universities rather aim at receiving the financial resources to equip their laboratories and to test their theories and conclusions under empirical conditions to expand their scientific knowledge (Becker and Eube, 2018; Siegel, D. A. Waldman, et al., 2004). Due to UIC, up-to-date equipment can be acquired or accessed (Ankrah and Al-Tabbaa, 2015). Nevertheless, J. Lee and Win (2004) argue that UIC is necessary because technology development alone is not sufficient. As mentioned before, more value can be created by collaborating with industry to explore how the technology can be applied (ibid.). Collaboration provides the universities with useful insights. Faculty members are exposed to practical problems, new ideas and to state-of-the-art technology (Ankrah and Al-Tabbaa, 2015). The industry's market knowledge can be used to develop technologies that are applicable and required, which is important for a technology's success (J. Lee and Win, 2004). Moreover, UIC can stimulate technological advancement and research activities in certain key areas (ibid.). UIC provides the opportunity to encourage the development of particular lines of university research relevant for the market (Ankrah and Al-Tabbaa, 2015).

Ankrah and Al-Tabbaa (2015) take it even one step further and discovered that UIC can also create business opportunities. For example, the development of spin-offs or spin-off companies (ibid.). In contrast to that, Siegel, D. A. Waldman, et al. (2004) discovered that some researchers disagree with their university's desire to create more academic startups because they think that researchers cannot be good entrepreneurs. In addition, if the market focus affects all types of research questions the quantity and quality of basic research could be affected (Ankrah and Al-Tabbaa, 2015). Moreover, high involvement in UIC could divert energy and commitment of faculty employees away from core educational activities (ibid.). Nevertheless, Siegel, D. A. Waldman, et al. (2004) found that the aforementioned bi-directional knowledge transfer sometimes even enables "better" basic research due to refinements of experiments and different perspectives on a problem that inspire the researcher to new ideas. Furthermore, UIC allows to test and get feedback for research ideas (ibid.). Results and interpretations can be used for the refinement of academic ideas and theories (ibid.). UIC allows testing and that connects back to Becker and Eube (2018), who argued that universities aim at receiving the financial resources to test their theories and conclusions under empirical conditions to expand their scientific knowledge. Nevertheless, there could arise a dilemma when developing technology, which is relevant for the market. On the one hand, the results can be published for short-term revenue and academic recognition (ibid.). On the other hand, one could withhold the results until they are patented, but then there exists the risk that the technology becomes obsolete (ibid.). Furthermore, it is possible that UIC has a negative influence on the integrity of academic research (Ankrah and Al-Tabbaa, 2015). For example, researchers sponsored by a company could be biased and report positive experimental results relating to the company's products (ibid.). In addition, there could be conflicts about the release of adverse results (ibid.).

2. Literature review

Another value of UIC for faculty members could be personal financial gain and additional income (Ankrah and Al-Tabbaa, 2015; Siegel, D. A. Waldman, et al., 2004). Although the gains do not only have to be financial in nature. UIC also provides the possibility to build credibility and trust for the academic researcher among practitioners, to publish papers and even joint publications with industry are imaginable (Ankrah and Al-Tabbaa, 2015). The value created by UIC could also enhance a university's reputation (ibid.). Furthermore, Siegel, D. A. Waldman, et al. (2004) name the aspiration to secure additional funding for graduate students as a value of UIC. In addition, Santoro and Chakrabarti (2001) also state that universities want to collaborate with industry in order to provide real-life experience for their students and faculty members. The intention is to expose them to real business environments, current insights into industrial research, how technologies are applied, instructional case studies and practical problems through projects (ibid.). Furthermore, universities try to provide students with internships and graduates with employment opportunities (ibid.). Becker and Eube (2018)'s findings go in the same direction and state that one motive for UIC for universities is the desire to provide their students with job opportunities.

To sum up, the value created for universities by UIC is multilayered and can be financial or non-financial. Public and private funding is an important reason for UIC (Ankrah and Al-Tabbaa, 2015; Barnes, Pashby, and Gibbons, 2002; Hagen, 2002). UIC can also lead to further income through licenses and patents created by UIC (Ankrah and Al-Tabbaa, 2015; Meyer-Krahmer and Schmoch, 1998). But also, knowledge exchange is an important value created by UIC and researchers prefer collaborative research distinctly over contract research (Meyer-Krahmer and Schmoch, 1998; Siegel, D. A. Waldman, et al., 2004). In addition, the industry's market knowledge can be used to encourage the development of particular lines of university research relevant for the market (Ankrah and Al-Tabbaa, 2015; J. Lee and Win, 2004). UIC can also create business opportunities (Ankrah and Al-Tabbaa, 2015), but there is criticism from researchers who think that researchers cannot be good entrepreneurs (Siegel, D. A. Waldman, et al., 2004). Furthermore, there exist concerns that there could be a negative effect of the market focus on quantity and quality of basic research and educational activities (Ankrah and Al-Tabbaa, 2015). By contrast, there are also research findings that state that UIC can enable "better" basic research (Becker and Eube, 2018; Siegel, D. A. Waldman, et al., 2004). Nevertheless, there could arise a potential dilemma regarding short-term or long-term focus (ibid.). Further value created by UIC can also be non-financial (Ankrah and Al-Tabbaa, 2015; Siegel, D. A. Waldman, et al., 2004). Non-financial value could be building credibility and trust for the academic researcher, joint publications, enhancing a university's reputation, providing real-life experience for students and faculty members, providing students with internships and graduates with employment opportunities (Ankrah and Al-Tabbaa, 2015; Becker and Eube, 2018; Santoro and Chakrabarti, 2001).

2.3.2. Value generated for students

As stated before, universities can benefit from industry's market knowledge, expertise in product development and commercialization when collaborating with industry (Sherwood, Butts, and Kacar, 2004). Ankrah and Al-Tabbaa (2015) agree that students can also benefit from UIC because they encounter practical problems, new ideas and might observe state-of-the-art technology. Hence, among other things the curriculum can be improved (Ankrah and Al-Tabbaa, 2015). This practical perspective improves student training and employment opportunities (Ankrah and Al-Tabbaa, 2015; J. Lee and Win, 2004). Santoro and Betts (2002) concur that companies often hire graduates with experience in UIC. In addition, the graduates' previous experience with UIC can be used to facilitate current and future UIC (ibid.). In consequence, the university's reputation will improve and a better reputation means better employment opportunities for students (Ankrah and Al-Tabbaa, 2015).

Furthermore, project-based learning creates value for students. Project-based learning is about engaging students in the investigation of a real-world problem given by industry (Blumenfeld et al., 1991). Project-based learning especially increases the effectiveness of UIC for entrepreneurship education (ibid.). Dooley and Kirk (2007) also consider UIC to be valuable and especially beneficial for entrepreneurship training because UIC brings together the strengths of university and industry. Assenza and Western (2017) agree that UIC is important for entrepreneurship training and entrepreneurship training in turn can be used to develop innovative thinking (Assenza and Western, 2017). One example of entrepreneurship education through UIC can be observed at Osaka University in Japan (Nakagawa et al., 2017). The idea is that when students face a real-world problem, they are motivated to test their ideas and to deepen their understanding (ibid.). This approach is an assimilation of how students would react to a problem occurring outside of university (ibid.). For project-based learning to be successful, students have to be cognitively engaged with a problem setting for a longer time (ibid.). If the project is interesting and valuable, the students feel capable of managing the project and the focus should be on learning rather than on outcomes and grades (ibid.). Dym et al. (2005) agree that project-based learning improves retention, student satisfaction, diversity, and student learning.

Moreover, also Meredith and Burkle (2008) discovered evidence that UIC through joint projects considerably improves student learning when they investigated UIC projects. Furthermore, Ollila and Williams-Middleton (2011) also argue that additional learning outcomes can be created by letting students make real world experiences. Nevertheless, they suggest a different approach than the authors mentioned before. They call it real-world situational learning and suggest letting students experiment with venture creation to get to know the realistic development of commercial ideas and to learn how to apply their theoretical knowledge (ibid.). The university education and this experiential approach complement each other (ibid.). On the one hand, problem-oriented thinking and on the other hand, solution-oriented thinking, which is both required when dealing with innovation (Nakagawa et al., 2017; Ollila and Williams-Middleton, 2011). To illustrate the benefit of combining university education with practical experience,

2. Literature review

Nakagawa et al. (2017) mention an example of a student that was able to consider different perspectives when looking at a newly developed technology due to prior experience with UIC. The student was able to consider the potential business model when evaluating a technology (ibid.). He realized that it was not only about the technology itself and its features, but also about how to commercialize it (Nakagawa et al., 2017). In other words, the students were able to build and improve their business skills and external collaboration skills while collaborating with industry, which otherwise would not have been possible (ibid.). Ankrah and Al-Tabbaa (2015) mention a similar way of thought. They do not refer to venture creation, but they claim that UIC might give students the ideas to develop spin-off companies (ibid.). Furthermore, UIC provides students with the opportunity to test their ideas and to receive feedback (ibid.).

Another value created by UIC for students is a richer learning process. The learning process can be described as a circle with the following stages: experience, reflection, conceptualization, and experiment (Kolb, 1984). According to Meredith and Burkle (2008), universities are more focused on abstract conceptualization and reflection, and students receive mostly academic theory. By contrast, industry deals more with practical aspects and can provide students with experience and let them experiment to enrich and complete their learning process (ibid.). Industry and university can complement each other when collaborating and create value for students in the process by enriching their learning process (ibid.). While university spends more time on reflection and conceptualization necessary for learning and innovation, industry can provide concrete experience, experimentation and testing of ideas (ibid.). Meredith and Burkle (2008) tested the usefulness of UIC by establishing student groups who became working consultancy teams. Meredith and Burkle (2008) claim that the students' consultancy projects were a real-life example of the triple helix thesis mentioned before (Etzkowitz, Webster, et al., 2000). Due to the students' consultancy projects students complement their theoretical perspective with practical insights from the business environment and understand how it works and how to deal with the constant and rapid change (Meredith and Burkle, 2008). Meredith and Burkle (2008) argue that although theoretical knowledge builds an important base, real-life experience is necessary to complete the learning cycle (ibid.). In addition, also Starbuck (2001) emphasizes how valuable it is for students to apply theory to practice and gain real-world experience. Moreover, J. Lee and Win (2004) align with their fellow researchers and claim that students need the opportunity to connect their theoretical knowledge with practical experience by exposing them to industry.

To conclude, UIC provides the following values for students. Students get the chance to gain practical insights and new ideas (Ankrah and Al-Tabbaa, 2015). This gained experience improves student training and employment opportunities (Ankrah and Al-Tabbaa, 2015; J. Lee and Win, 2004; Santoro and Betts, 2002). Furthermore, UIC can provide students with project-based learning, which is about engaging students in the investigation of a real-world problem given by industry (Blumenfeld et al., 1991). The idea is that when students face a real-world problem they are motivated to test their ideas and to deepen their understanding of the real world (Blumenfeld et al., 1991; Dym et al., 2005; Meredith and Burkle, 2008; Ollila and Williams-Middleton, 2011). Furthermore, students are able to build and improve their business skills

and external collaboration skills while collaborating with industry (Blumenfeld et al., 1991). Another value created by UIC for students is a richer learning process (Meredith and Burkle, 2008). Although theoretical knowledge builds an important base, real-life experience is necessary to complete the learning cycle (J. Lee and Win, 2004; Meredith and Burkle, 2008; Starbuck, 2001).

2.3.3. Value generated for industry

In the following Section, the literature about the value, which UIC creates for industry, will be highlighted. The intention was to create a comprehensive overview of the values that UIC creates for companies to figure out, which values are connected to innovation and how students can create even more value in these areas.

UIC in general increases the industry's innovation capacity (Viale and Etzkowitz, 2010, p.83). In addition, companies increasingly explore different possibilities for also including students more in these collaborations (ibid.). Universities do not only create new technology but are also the source of new skilled personnel (J. Lee and Win, 2004). Universities do not only provide knowledge, but also highly trained students and graduates. On the one hand, collaborations have a high failure rate (Ankrah and Al-Tabbaa, 2015), but on the other hand, if the UIC is well managed, industry can benefit from universities' complementary expertise, knowledge and resources that are often unavailable within industry (Starbuck, 2001). Furthermore, a partnership rather than sponsorship gives the industry more control (Jacob et al., 2000). In case of sponsorship, the industry provides funds and only gives an outline of the research task, but the researchers have full control over content and organization of the research process (ibid.). Joint problem solving becomes more favored, which leads to an increase in participatory research methods (ibid.). Furthermore, Jacob et al. (2000) distinguish between continuous dialogue process and the common problem-oriented dialogue. During a continuous dialogue process the problem is not pre-defined, but the researcher observes the situation at the company first and then tailors a solution to the discovered problem (ibid.). Perkmann and Walsh (2007) also found that collaborative activities provide more value to companies than ready-made university-generated technology. Furthermore, Perkmann and Walsh (2007) found evidence that collaborative activities have a larger impact on industrial innovation processes than just adopting innovations discovered by universities. Companies can use UIC to build capabilities and to learn instead of focusing on tangible outcomes (Perkmann and Walsh, 2007). This attitude is also the objective of the government when providing public funding for most research collaborations (ibid.).

The shift to the knowledge-based economy that we can observe nowadays is also a reason for the increasing interest for participating in UIC from industry's side (Santoro and Betts, 2002). One value created by UIC for the industry is that a company's reputation can be improved (George, Zahra, and Wood, 2002). Santoro and Betts (2002) agree and mention that companies engaging with universities can be perceived as socially responsible businesses and hence a company's reputation can be enhanced (Ankrah and Al-Tabbaa, 2015). A positive reputation in turn can help to attract talented students (J. Lee and Win, 2004). Bringing in enthusiastic

2. Literature review

and critical students improves moral between employees and motivates them (Salter and Martin, 2001). Nakagawa et al. (2017) also came across this aspect when analyzing their data. One of their interviewees said that the students' curiosity was very motivating and they also questioned things the company's employees just saw as the status quo (ibid.). The students asked questions about the nature of the technology, business, and corporation and that led to a fresh perspective (ibid.). The new perspective encouraged discussions that led to new ideas including a wide range of viewpoints (Nakagawa et al., 2017). The industry partners started to question their thinking, which sometimes was biased by for example competition, customers, colleagues, or even the management (ibid.). Based on these insights the companies even thought about changing their technology development policy or commercialization plan (ibid.) These developments showed the importance of diversity and its impact on idea creation (ibid.). Jacob et al. (2000) agree and state that one of the biggest values of UIC for companies are the new perspectives, ideas and knowledge that come with the collaboration. The researchers' or students' advantage is that they have the distance and space to reflect what they observe without being hindered by practical concerns (ibid.).

According to Barnes, Pashby, and Gibbons (2002), UIC provides companies with the possibility to complement their in-house R&D because research can be pursued that would not be authorized in-house. The guidelines for UIC research are looser since cost and risk are shared (Barnes, Pashby, and Gibbons, 2002). For instance, the risk of non-performance of the developed technology or the risk that the market does not buy the launched product (Ankrah and Al-Tabbaa, 2015). Ankrah and Al-Tabbaa (2015) also discovered that UIC leads to more cost-effective research than similar research in-house. Nevertheless, one difficulty with UIC for companies could be that they have less control and that it is possible that proprietary information leaks (ibid.). On the contrary, collaboration with universities leads to less conflicts compared to when two competitive companies collaborate (Santoro and Betts, 2002). Ankrah and Al-Tabbaa (2015) concur that UIC is beneficial because it avoids conflicts of interest between companies. Moreover, UIC leads to improved competitiveness for companies (ibid.). Furthermore, a company's economic growth is accelerated, and more wealth is created (ibid.). By contrast, George, Zahra, and Wood (2002) claim based on their research that it could not be proven that UIC causes better financial performance. Furthermore, Ankrah and Al-Tabbaa (2015) also state that UIC poses a financial risk to the industry. Nevertheless, George, Zahra, and Wood (2002) claim that UIC is a possibility for a company to increase innovation. Their study shows that UIC is positively linked with a company's innovative outputs (ibid.). Furthermore, they discovered that UIC leads to lower R&D expenses for companies although their innovative output was higher (ibid.). They measured innovative output by considering a company's number of patents (ibid.). Ankrah and Al-Tabbaa (2015) also found an increased number of patents, prototypes and generation of IPRs for companies. Notwithstanding, there is a risk that universities and companies get into a dispute about intellectual property rights and patents (ibid.). Nevertheless, Ankrah and Al-Tabbaa (2015) state that UIC is not only about patents and improved innovative capability but also about helping companies to keep up with change and technological develop-

2. Literature review

ments. In addition, it is about keeping up with the technological developments, but also about using UIC to advance new technologies and to speed up the time to market of innovation (ibid.). Relating back to the argument stated before that UIC provides companies with the possibility to complement their in-house R&D because research can be pursued that would not be authorized in-house (Barnes, Pashby, and Gibbons, 2002), Nakagawa et al. (2017) have interesting finds about this aspect. They researched an UIC program in Japan that included students and industry partners (ibid.). The program was just temporary and independent from the companies' daily business (ibid.). Due to independence and limited time frame the participants were motivated to experiment and explore new opportunities without limiting their ideas with thoughts about risks and stakeholders (ibid.). As stated before, it can be beneficial to take some distance and space for reflection without being hindered by practical concerns (Jacob et al., 2000).

One difficulty with UIC can be that universities on the one hand have a broad knowledge, but on the other hand, it is possible that universities create too theoretical and impracticable solutions that cannot be applied in the business world (Ankrah and Al-Tabbaa, 2015). Y. S. Lee (2000) claims that collaboration is useful to help the industry to ensure the applicability of the research, which is very important for companies. Furthermore, the universities' long-term focus might collide with the companies' rather short-term focus and there can be conflict during R&D development (ibid.). Nevertheless, in the field of technological research, UIC can help companies to shift the universities' research focus to areas of interest to industry when identifying needed research areas (Fusfeld, 1995). Furthermore, companies hope that the research results are taught to students at some point to increase the number of graduates with relevant industry knowledge that they can hire (ibid.). Ankrah and Al-Tabbaa (2015) agree with that and state that companies receive the opportunity to influence and stimulate, which research areas universities pursue when collaborating with them and companies can initiate new programs for the industry (ibid.). Furthermore, universities can provide specialized consulting, identify relevant problems, and solve specific technical problems (ibid.).

While collaboration with companies provides universities with revenues and sometimes also new knowledge, companies can also profit from UIC by getting access to new knowledge, key sources of innovation and completely new technologies (Ankrah and Al-Tabbaa, 2015; George, Zahra, and Wood, 2002). Furthermore, industry participants can learn more about the methodology of technology development, commercialization methodology skills and more skills for team building (Nakagawa et al., 2017). UIC can lead to improved or even completely new products (Ankrah and Al-Tabbaa, 2015). Same applies for processes (ibid.). Another advantage is that the product testing becomes more credible and reliable when a university is involved (ibid.). Products developed in collaboration with universities seem to have a higher rate of acceptance and legitimacy (ibid.) This increased legitimacy is especially important for software products (ibid.). Moreover, companies can profit from multidisciplinary research expertise and research infrastructure (ibid.). In addition, collaborating with a university can grant a company access to the university's research network, which can not only include other universities, but also other companies (George, Zahra, and Wood, 2002). This access can lay the foundation for additional

2. Literature review

and even more valuable collaborations (ibid.). Companies have the chance to get access to an international network of expertise (Ankrah and Al-Tabbaa, 2015). Ankrah and Al-Tabbaa (2015) call UIC as a “catalyst” for other collaborations (p.12). Furthermore, joint publications between universities and industry are conceivable (ibid.). In addition, the company’s employees can profit from universities’ knowledge and use the UIC to continuously train and develop themselves professionally (ibid.). Nakagawa et al. (2017) for example observed that some employees started to change their everyday behavior at work. Due to the collaboration with universities they considered the theoretical viewpoint before acting (ibid.).

In addition, another value of UIC for companies is that it not only provides companies with access to public funding (Ankrah and Al-Tabbaa, 2015), but research identified skilled graduates as one of the main benefits of publicly funded research (Salter and Martin, 2001). Most graduates are well-trained and bring new knowledge to the industry (ibid.). Furthermore, they are able to solve complex problems and to perform research and develop ideas (ibid.). On the other hand, most of the time, graduates still have to be trained when starting at a company, which involves high costs (ibid.). Nevertheless, Salter and Martin (2001) admit that changing the curriculum is not an option because the more generic academic education lays the foundation for the industry-specific skills and knowledge and the students gain long-lasting skills. Hence, they claim that students should also be exposed to the industry to complement their academic education with practical experience of companies’ needs and competencies instead of changing the education (ibid.). J. Lee and Win (2004) state that there are better-equipped graduates entering the job market due to UIC. Furthermore, if companies collaborate with universities they get the chance to get to know the students and to hire the most talented graduates (Ankrah and Al-Tabbaa, 2015). In addition, UIC uncovers the companies’ needs and in contrast to Salter and Martin (2001), J. Lee and Win (2004) suggest that the students’ training could be adapted accordingly. Furthermore, when conducting basic research, graduate students develop skills that can be very useful for companies if they are able to hire them after they finish their basic research (Salter and Martin, 2001).

All in all, UIC creates value for companies because UIC in general increases the industry’s innovation capacity (Viale and Etzkowitz, 2010, p.83; George, Zahra, and Wood, 2002). On the one hand, collaborations have a high failure rate (Ankrah and Al-Tabbaa, 2015), but on the other hand, if the UIC is well managed industry can benefit from universities’ complementary expertise, knowledge and resources that are often unavailable within industry (Starbuck, 2001). Furthermore, a partnership rather than sponsorship gives the industry more control (Jacob et al., 2000). UIC can also help companies to improve their reputation (Ankrah and Al-Tabbaa, 2015; George, Zahra, and Wood, 2002; Santoro and Betts, 2002). Another value is that enthusiastic and critical students bring in a fresh perspective and they improve morale and motivation of employees (Jacob et al., 2000; Nakagawa et al., 2017; Salter and Martin, 2001). Moreover, UIC provides companies with the possibility to complement their in-house R&D and to reduce the cost of research (Ankrah and Al-Tabbaa, 2015; Barnes, Pashby, and Gibbons, 2002). In addition, collaboration with universities leads to less conflict compared to when two competitive companies

collaborate (Ankrah and Al-Tabbaa, 2015; Santoro and Betts, 2002). UCI also helps companies to keep up with change and technological developments (Ankrah and Al-Tabbaa, 2015). UIC is also useful to help industry to ensure the applicability of the research (Fusfeld, 1995; Y. S. Lee, 2000). Furthermore, UIC can lead to improved or even completely new products and processes (Ankrah and Al-Tabbaa, 2015). In addition, collaborating with a university can grant a company access to the university's research network (Ankrah and Al-Tabbaa, 2015; George, Zahra, and Wood, 2002). Another value is that universities do not only provide knowledge, but also highly trained students and graduates (Ankrah and Al-Tabbaa, 2015; J. Lee and Win, 2004).

2.3.4. Influencing factors of UIC

There are several important issues to manage, when establishing UIC. The first step is to carefully select the collaboration partner, which is crucial for a collaboration's success (Barnes, Pashby, and Gibbons, 2002). Complementary expertise for example is an important aspect to consider in order to have a successful collaboration (ibid.). In a second step, the collaboration partners should agree on priorities and timescales, which are the most significant cultural issues that can emerge (ibid.). Jacob et al. (2000) also mention the importance of time based on their research results. They found that reflection time for researchers and also the industry participants is very important. Researchers need space to reflect on what they have observed at the company and what solutions they might develop in collaboration with their industry partners (ibid.). It is also useful to take some time to generalize the researcher's collaboration observations and experiences so that they can be used in the future (ibid.). The reflection time can also be used to update basic knowledge or to reflect together with other researchers that are not involved in the collaboration (ibid.). Jacob et al. (2000) declare these activities as the team's contributions to innovation capability. Time is also important for the industry partners because they need the possibility to implement the solutions that emerged from UIC (ibid.). By contrast, Nakagawa et al. (2017) argue for the advantages that a limited time frame has to offer. When they investigated a UIC entrepreneurship education program in Japan, they discovered that the limited time frame of the program created an exploratory thrive among the participants and increased their motivation (ibid.). Furthermore, the independence offered by the program motivated the participants (ibid.). Participants had the opportunity to pursue new ideas and new ways of thinking, independent from their everyday work (ibid.). They were motivated by this unique opportunity (ibid.).

As mentioned before, it is necessary to agree on priorities when entering a UIC partnership (Barnes, Pashby, and Gibbons, 2002). To ensure motivated participants it is important how the collaboration is managed. The collaboration should be well planned and effective communication should be encouraged (ibid.). Moreover, the goals of the collaboration have to be set (ibid.). It is essential to identify common objectives (Huhtelin and Nenonen, 2015). Barnes, Pashby, and Gibbons (2002) also agree that complementary aims and commitment of the partners are significant for the collaboration's success. The starting point should be to examine the general motives of researchers and industry partners (Y. S. Lee, 2000). If there is no overlap, the collaboration

2. Literature review

cannot be successful (*ibid.*). To ensure success, Barnes, Pashby, and Gibbons (2002) recommend achieving a good balance between academic and industrial objectives to ensure a mutual benefit. Furthermore, they identified the need to manage opinions and attitudes towards academic right to publish and the role of student researchers during the project (*ibid.*). According to Barnes, Pashby, and Gibbons (2002)'s research results the role of doctorate students was the most significant cultural issue because they have strict academic requirements for their work and if they are not considered the students' value-adding capacity is limited. For example, one problem were unclear or frequently significant changes to project objectives or a short-term focus among the industrial partners (*ibid.*). Furthermore, to ensure the collaboration's success continuity is important. For example, regarding personnel, especially of the project manager, and corporate stability (*ibid.*). After these aspects have been considered the collaboration partners should also agree how the collaboration progress is monitored (*ibid.*).

Another influential factor for UIC are the individual characteristics of the participants. First of all, the demographic factors. Empirical evidence on the influence of age is very ambiguous and there are no clear results (Giuliani et al., 2010). Nevertheless, there seems to be a clear opinion regarding sex. Most research results suggest that male academics collaborate more with industry (Bozeman and Gaughan, 2007; Haeussler and Colyvas, 2011; A. N. Link, Siegel, and Bozeman, 2007). By contrast, Bozeman and Gaughan (2007) discovered that researchers with frequent industry interaction are female. Giuliani et al. (2010) also provide evidence that female researchers are more engaged with industry (*ibid.*). They argue that more and more highly capable and motivated women are coming into the picture and increasingly take part in UIC (*ibid.*). However, they admit that this phenomenon is limited to specific organizational contexts where UIC is already well established (*ibid.*).

Moreover, Giuliani et al. (2010) discovered that a higher position at a university, for example full professor, associate professor, or senior researcher, leads to more UIC. They argue that seniority of the researchers or professors is important for industry partners' trust and confidence in their academic partners (*ibid.*). Furthermore, UIC is often initiated through personal contacts and more senior researchers have probably built a large network of contacts during their career that they can draw from to find suitable industry partners to collaborate with (Giuliani et al., 2010; Haeussler and Colyvas, 2011). A. N. Link, Siegel, and Bozeman (2007) agree that seniority, and especially tenure, have a positive effect on the participation in UIC. Moreover, also Haeussler and Colyvas (2011) found that more senior academics, with a lot of publications and employees, are more involved in UIC. In addition, also Ponomariov (2008) found that tenure has a positive influence on the interaction of individual researchers with industry partners. He argues that usually at traditional academic departments basic research and publications in renowned journals are rewarded and not-yet tenured researchers may fear that UIC will distract them from writing papers that could lead to tenure (*ibid.*). By contrast, Bozeman and Gaughan (2007) found that young researchers are more involved in UIC. They argue that their findings coincide with the findings of other researchers and take it as proof that the younger generations aim more for the applicability of research (*ibid.*). One reason for this development could be the influence

2. Literature review

of universities and government that emphasize the importance of UIC (*ibid.*). Furthermore, it is also possible that young academics view collaboration with industry as beneficial for their future career (*ibid.*). Giuliani et al. (2010) also found that younger academics are more willing to collaborate with industry than their senior colleagues. They call it a “new trend and mentality among younger scholars” (Giuliani et al., 2010, p.755). Giuliani et al. (2010) state that their findings are congruent with the findings of D’Este and Patel (2007). D’Este and Patel (2007)’s findings not only show that younger academics participate more frequently, but also that they participate in a greater variety of interactions. Furthermore, D’Este and Patel (2007) concur with Bozeman and Gaughan (2007) that one reason for this development could be the positive influence of industry interaction on the academics’ reputation and that they can use it to kick-start their career. According to Perkmann, Tartari, et al. (2013)’s findings the best and most successful academics are more likely to collaborate with industrial partners.

Furthermore, Perkmann, Tartari, et al. (2013) discovered that the ability to mobilize funds for research has a positive impact on collaboration with industry. They also link the ability to mobilize funds back to a researcher’s success in his research area since grant funding is based on a peer-review process (*ibid.*). Perkmann, Tartari, et al. (2013) assume that the industry takes this ability and the researchers’ success as factors to select suitable collaboration partners and hence UIC increases. Furthermore, the government also influences researchers to collaborate with industries by rather granting grant proposals that include UIC (*ibid.*). A. N. Link, Siegel, and Bozeman (2007) concurs and state that research-grant active academics tend to interact more with industry.

On an organizational level there are also factors that influence UIC. An institution’s academic quality has an influence on the interaction of academics with industry. On the one hand, Ponomariov (2008)’s research results support the impression that in general industry wants to get access to high quality academic research. When considering UIC the mutual research also includes advanced degree students that are responsible for development, testing, and experimentation work and gives them the opportunity to find opportunities to start other research collaborations (*ibid.*). Ponomariov (2008) claims that this is especially likely in prestigious academic institutions. On the other hand, although high quality institutions are attractive for the industry, Ponomariov (2008) found that the higher the quality of an institution is, the lower the willingness of the institution’s academics to collaborate with the industry. Ponomariov (2008) argues that it is possible that the prestigious environment influences the academics to rather pursue basic, peer-reviewed research and not to be distracted by UIC. Giuliani et al. (2010) also claim, based on their data, that well-established researchers with high research quality are not pursuing applied research projects with the intent of solving practical issues. As mentioned before, usually tenure has a positive impact on UIC. Nevertheless, Ponomariov (2008) found that the effect of tenure is negatively moderated by the industrial R&D spending at universities. In other words, the more industry invests into R&D expenditures at universities, the smaller the positive effect of tenure on UIC (*ibid.*). Therefore, at these universities there would be fewer young and tenured researchers collaborating with industry (*ibid.*). Nevertheless, they argue that

2. Literature review

their results suggest that industry R&D funding increases the interaction of researchers and industry. Furthermore, industry R&D funding allows to recruit more masters student through grants and counteracts the negative effect that not being tenured has on the tendency to collaborate with industry (ibid.) Moreover, they concur that the higher academic quality is the lower is the tendency to collaborate with industry, but it increases the amount of PhD students supported through grants (ibid.). The support of masters or PhD students through grants helps industry to get researchers to collaborate with them (ibid.). Ponomariov (2008) also found that the intention to collaborate from the researchers' side is increased when master's students are supported by industrial R&D funding. All in all, industrial funding at universities facilitates and encourages collaboration between researchers and industry partners.

Geography also plays a significant role for the formation of UIC. D'Este, Guy, and Iammarino (2013)'s results show that geographical proximity increases the probability of UIC. Geographical proximity is important for the generation and exchange of knowledge, especially if it is difficult to express and understand (Oort, Burger, and Raspe, 2008, p. 14, 33, 34). By contrast, Torre and Rallet (2005) argue that geographical proximity is not required permanently, but only during some time periods. They claim that after the collaboration is set up, short- and medium-term visits are enough to meet face-to-face to exchange knowledge (ibid.). Nevertheless, after an UIC is established, the physical space where the participants meet seems to be an important factor for the collaboration's success. Huhtelin and Nenonen (2015), for example, reviewed 210 references to investigate which types of space best support knowledge sharing in UICs. They claim that campus management is an important success factor for the collaboration between students, researchers, entrepreneurs, and industry (ibid.). For example, it is useful to bring people from different disciplines together because multidisciplinary exchange is very valuable (ibid.). The participants can inspire each other with different perspectives (ibid.). The multidisciplinary exchange positively influences UIC (ibid.). Perkmann, Tartari, et al. (2013) found that new organizational structures that make use of expertise from various research areas seem to be a vital factor in facilitating UIC. Bozeman and Gaughan (2007) agree and state based on their research that academics related to multidisciplinary science centers engage more with industry partners.

Furthermore, Huhtelin and Nenonen (2015) highlight the importance of "Ba" for the success of UIC. "Ba" is the context through which the collaboration partners share feelings, emotions, experiences, and mental models (ibid.). This is important for knowledge creation and exchange (ibid.). The Japanese concept of "Ba" was first introduced by Nonaka and Konno (1998). "Ba" means "place" (ibid.). After establishing UIC, "Ba" can be useful for the first steps and throughout the whole collaboration (Huhtelin and Nenonen, 2015). First of all, "Ba" supports the trust formation among the UCI participants (ibid.). Trust is essential for the success of UIC and decides if a collaboration is high- or low-performing (Bstieler, 2006). Trust is built over time and grows as the knowledge increases and the interacting participants start to understand each other better (ibid.). Furthermore, "Ba" supports the creation of new ideas, opportunity identification, creation of concepts, technologies and new social networks of specialists (Huhtelin and Nenonen,

2. Literature review

2015). “Ba” is a space shared by the UIC participants, a shared platform, with the objective to create and advance knowledge (Nonaka and Konno, 1998). According to Nonaka and Konno (1998), this space can be physical, virtual, mental or any combination of them. Mental space means for example shared experiences, ideas, or ideals (ibid.). Nevertheless, “Ba” is not just human interaction, but it is a platform that integrates the necessary information to build new knowledge (ibid.). Kristensen (2004) claims that the choice of place and space has an influence on creative processes because it has an effect on the well-being of people, the information channels and the availability of knowledge. In his article, he suggests that the physical requirements vary between the different stages of the creative process (ibid.). Common and private spaces are usually required during the preparation and elaboration stages, whereas the incubation and insights stages rather require more private space (ibid.). Jacob et al. (2000) agree that it is important that researchers go back to their own space at university for reflection on the problems identified and the created solutions during the collaboration. In addition, Kristensen (2004) states that it is important to keep useful information like tables, images, objects etc., which were developed in the beginning as a group, close and accessible throughout all the stages. So, that participants have access to it and can revisit it to trigger their creative thinking when working in private spaces later on (ibid.). Appel - Meulenbroek, de Vries, and Weggeman (2014) claim that studies looking at face-to-face and virtual communication showed that face-to-face communication is still necessary for knowledge sharing. Nevertheless, they admit that the added value of physical workplace for innovation processes remains hard to be proven empirically, but still the visibility of colleagues seems to be positively correlated with the number of knowledge sharing meetings (ibid.). Jacob et al. (2000) also agree that the participants of UIC should interact regularly and not only when problems are about to arise. The continued interaction can give for example the researcher a good overview of the company and that can help him to detect improvement potential early-on (ibid.). In addition, face-to-face interaction helps to build trust between UIC partners, which is, as mentioned before, an important factor for the success of UIC (Huhtelin and Nenonen, 2015).

Accompanying services are also an important factor for the success of UIC. Already during the 1980s, Caldwell and O’Reilly (1982) discovered that it could be useful to have an interaction facilitator for UIC. They called it “boundary spanning” and used a bridge metaphor to explain how “boundary spanning” would connect the different environments in which companies and universities operate (ibid.). The goal of “boundary spanning” is to correctly communicate the needs, capabilities and interests of each collaboration partner (ibid.). In 2015, Huhtelin and Nenonen (2015) also stated that it is beneficial to have someone that guides and supports the collaboration and facilitates trust. According to Barnes, Pashby, and Gibbons (2002), trust among collaboration partners is critical for a successful collaboration. Jones and Burgess (2010) also suggested a person that facilitates collaboration and called the person “champion facilitator”. Nakagawa et al. (2017) also researched the usefulness of a program facilitator when doing research about a UIC entrepreneurship education program. In this program, the person was called a “mediator or an agent” of the exchange of knowledge (ibid.). In this case, the role was a bit different because

2. Literature review

the mediators only interfered when problems arose and did not have a precautionary function as suggested before (ibid.). Nevertheless, the mediators gave an introduction to help the participants to understand each other's ideas and opinions, given their different backgrounds (ibid.). The mediators wanted to establish a shared language for the diverse participants (Nakagawa et al., 2017). For example, they offered instructions and subsequent lectures about teamwork, cooperation and how to encourage the spirit required for technological commercialization (ibid.). For this program, they chose mediators from the university and company employees with prior experience in UIC (ibid.). Nevertheless, the goal was to minimize the mediators' interference with the collaboration projects to keep the focus on the participants' ideas and experiences (ibid.). The participants alone decided which opportunities to follow or not and the mediators only interfered if the participants could not continue without help coming from outside the team (ibid.). By contrast, Siegel, D. A. Waldman, et al. (2004) found that facilitators can also become an obstacle to UIC if not managed well. In their case, there was a central function at university organizing UIC (ibid.). The process of UIC was therefore very complicated and university employees tried to avoid going through the central function although researchers and students could have profited from this central function if it would have been managed better (ibid.). All in all, facilitators seem to have an important and helpful role, but one has to be aware of not making the process too complicated.

To conclude, the most important influential factors of UIC are cultural issues, individual characteristics, factors on the organizational level and accompanying factors. Cultural issues include time, setting of objectives and the management of different attitudes and opinions and these issues have to be managed to ensure collaboration success. To assess the influence of individual characteristics on UIC, one has to consider demographic factors, hierarchical position, seniority and tenure at the university and the ability to mobilize funds. Furthermore, factors on an organizational level that influence UIC include the quality level and reputation of the academic institution. The influence that the quality level and reputation of the academic institution have can be altered through industrial R&D spending at universities. Geographical proximity also plays an important role for the success of UIC. The necessity of geographical proximity and physical requirements depend on the different collaboration stages and should be adapted depending on the circumstances. Furthermore, trust has an important influence on UIC and can be built for example through "Ba". A multidisciplinary environment and organizational structure can also have an impact on the willingness for UIC. Last but not least, accompanying services, for example in form of collaboration facilitators, can influence the course of the collaboration. How this facilitator is called, and the level of involvement varies in the reviewed literature, but there seems to be a consensus that this role has an influence on the outcome of the collaboration.

2.4. Summarizing chapter to unite UIC and innovative thinking

In this chapter, the previous chapters of the literature review will be brought together. For this reason, the findings of the literature review are summarized in a table to give a better overview

2. Literature review

(see Appendix Table B.1).

Based on the reviewed literature, it becomes apparent that universities, students, and companies benefit from UIC. Industry gets access to academic knowledge, while universities receive more funding and the chance to create business opportunities. Together both sides profit from knowledge exchange. The focus of this research projects lied on the effect of UIC on students' innovative thinking. Due to the collaboration of university and industry the students' learning experience is more diversified and the two parties provide complementary aspects to student learning. Industry gives students access to practical know-how and they can apply their theoretical knowledge. Students can work on real world problems, expand their perspectives, create and test ideas and thereby develop their innovative thinking. When collaborating with companies students can question the status quo and bring in a fresh perspective, which can lead to innovation for the company and also develop the students' innovative thinking, because innovative thinking is about breaking frames, questioning things and to identifying new opportunities. Nevertheless, in order for UIC to be successful certain factors have to be considered like company culture, individual characteristics, university selection etc. (see Ankrah and Al-Tabbaa, 2015; Blumenfeld et al., 1991; Jacob et al., 2000; J. Lee and Win, 2004; Meredith and Burkle, 2008; Meyer-Krahmer and Schmoch, 1998; Nakagawa et al., 2017; Ness, 2015; Ollila and Williams-Middleton, 2011; Salter and Martin, 2001; Starbuck, 2001).

All these considerations are summarized in the following framework (see Figure 2.5). The

University-industry collaboration and its effect on innovative thinking among students

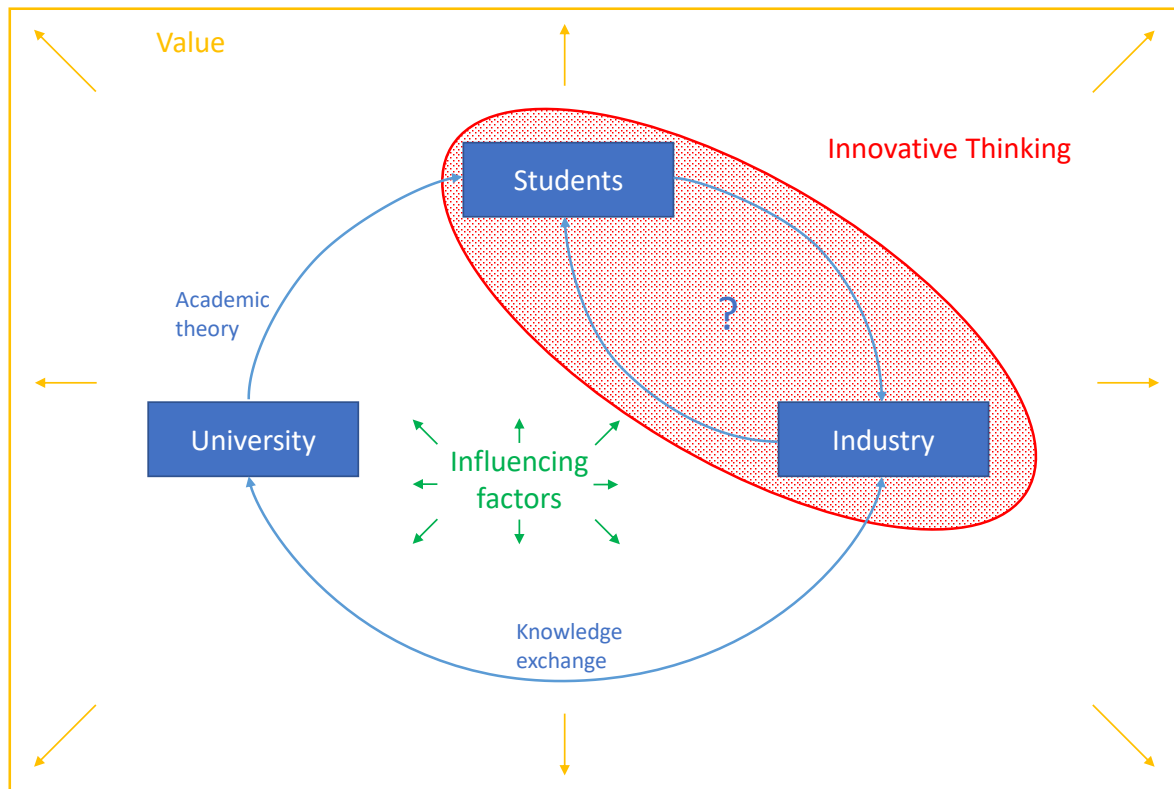


Figure 2.5.: Framework.

2. Literature review

framework was designed to illustrate the value created by UIC and the effect of UIC on innovative thinking among students. The relationship between university, industry and students is described as a circular relationship. There exists a knowledge exchange between university and industry that flows in both directions. The university teaches the students, academic theory. The students internalize what they have learned. Then, when collaborating with industry students can apply their knowledge. The students have a fresh mind and can provide industry with new insights and question existing processes (Jacob et al., 2000; Nakagawa et al., 2017; Salter and Martin, 2001). Therefore, arrows going in both directions were used to describe the relationship between industry and students. What students and industry exchange in detail is further investigated in the following chapters. Given the literature about UIC, it can already be said that students seem to develop an innovative way of thinking when collaborating with industry, illustrated by the red surface in Figure 2.5. Furthermore, different factors can influence the collaboration of students and industry, and UIC in general. The “Influencing factors” mentioned in Section 2.3.4 are included in the framework, represented by the green arrows in the center. Moreover, the overall value created by UIC, and described in Section 2.3, is illustrated by the yellow arrows and the frame comprising the framework’s contents.

3. Methodology

In this chapter, it will be explained how this research project was conducted. The rationale for research strategy and research design will be explained. Furthermore, the data collection process and sources will be clarified. In addition, the data analysis process will be pointed out. In the end, the quality of this research project will be discussed.

3.1. Research design

The research project was focused on the value that UIC creates when students are involved and its effects on innovative thinking among students. The research questions were the following:

RQ1: What value does university-industry collaboration create when students are involved?

RQ2: What are the effects of university-industry collaboration on innovative thinking among students?

To answer the research questions, an inductive approach was mostly used. For answering the first research question, the focus was on observing and exploring why industry, students and university engage in collaboration and what potential value it can generate for the participating actors (Bell, Bryman, and Harley, 2011). For answering the second research question, it was examined if the innovative thinking of students develops due to the interaction with industry. Nevertheless, also a deductive approach was partly used because I expected that UIC leads to more innovative thinking (ibid.). A cross-sectional research design was used to capture variation between the perspectives of different representatives from university and industry and also students (Bell, Bryman, and Harley, 2011). It was necessary to use multiple sources of evidence, rather than relying on a single source to identify similarities and differences (ibid.). I prioritized breadth over depth, in other words I focused on conducting several interviews instead of a few long ones. The average duration of an interview was 35 minutes. In addition, the research purpose was exploratory (ibid.). A multiple case study would have been beneficial if the focus was on the unique aspects of specific UIC cases. However, I was not interested in the unique cases, but I wanted to explore the correlation of UIC with innovative thinking among students in general. Since this research design was used, it was not possible to identify causal relationships, because it was not set up as an experimental design (ibid.). Nevertheless, it was possible to draw some conclusions about causality, although the credibility of causal findings and hence the internal validity is lower than when applying an experimental design (ibid.).

3.2. Research strategy

As a pilot research, a survey was conducted to collect quantitative data to assess the effect of UIC on innovative thinking among students. The pilot study was conducted through an online survey targeted at students. This data collection relied on predetermined parameters that can be used as indicators of innovative thinking. I started with a quantitative study to get a broad overview over UIC. In a next step, I collected qualitative data and conducted interviews with a student that has her own start-up, a recent graduate and a company representative that supports UIC to capture the student and industry perspective. The rationale for this approach was to first get a broad overview of UIC and then go into more depth with the interviews. The pre-study was conducted before going into the main research project to develop an understanding for UIC and to set an appropriate scope for the literature review and the research project in general. The purpose of this research project is to fill the research gap about UIC when students are involved, referred to as industry student collaboration. The results of the pre-study allowed to better assess what aspects of industry student collaboration should be looked at in more depth to start closing this research gap. The analysis of the pre-study data led to the conclusion that not only the student and industry perspective has to be considered to answer the research questions, but also the university perspective to get a comprehensive overview over value creation and the development of innovative thinking. Therefore, the university perspective is included in this research project. Furthermore, the data from the pre-study implied that certain aspects of UIC have an effect on innovative thinking of students and it was decided to investigate these aspects in more depth by conducting more interviews with a similar sampling strategy to the one from the pre-study.

Although the pre-study incorporates quantitative elements the strategy for the main research project was a qualitative approach, because this is the best fit with the purpose and focus of this research project. The qualitative method has been determined to be a suitable approach since qualitative research is about studying people's lives and behavior under real world circumstances and it gave the interviewees the possibility to share their thoughts and opinions on the topic to try to understand their reality (Yin, 2011). By using a qualitative approach, the possibility was increased of gathering unexpected and revelatory data, whereas a quantitative study would have been more dependent on predetermined parameters that could have limited possible findings (Bell, Bryman, and Harley, 2011). All in all, I wanted to take a more exploratory stance and generate rather than test theory to fill the research gap about UIC when students are involved (ibid.). Furthermore, epistemological considerations are part of a research strategy. It is important to state what is acceptable knowledge in a discipline (Bell, Bryman, and Harley, 2011). The cornerstone of this research project was interpretivism rather than positivism. This was a good fit with the research design assuming that the interpretation of reality varies from person to person. Hence, also a cross-sectional research design was chosen to examine the different perspectives of university, students and industry to capture variation in their respective interpretation of reality (Bell, Bryman, and Harley, 2011). Moreover, ontology is part of a research strategy. In this research project, constructionism was the base rather than objectivism.

Constructionism defines reality as the result of interaction among various individuals (ibid.). It was appropriate for this research project because the interaction between industry, students and university was investigated assuming that innovative thinking is a result of it.

3.3. Data collection

In the following chapter, the collection of the secondary data, used to conduct the literature review, will be explained. After that, the collection of primary data will be described. It will be explained, which respondents were interviewed to investigate the different relevant perspectives to answer the research questions and why they were selected.

3.3.1. Secondary data

The literature review is based on secondary data. To collect relevant secondary data, the research questions were used as a base to set clearly defined boundaries for the literature review (Bell, Bryman, and Harley, 2011). Furthermore, due to the conducted pre-study it was possible to get an initial impression of UIC. Therefore, the main theoretical and conceptual terms that define the topic area could be determined (ibid.). The strategy of the literature review was to find information about innovation, innovative thinking and UIC first. In a second step, the three different perspectives, relevant for answering the research questions, were explored in more depth (university, industry and students). In a third step, the collected information was combined to connect UIC and innovative thinking. These main theoretical and conceptual terms were translated into search terms used for the literature review. The search terms were the following: innovation, innovative thinking, UIC, definition UIC, types of UIC, companies and collaboration, universities and collaboration. Electronic databases like “Web of Science” and “Business Source Premier” were used to find relevant literature. The Gothenburg University Library search function was not only used to search for literature, but was also always used to verify that articles were peer-reviewed. To find suitable references, criteria for inclusion and exclusion were set (ibid.). As stated before, the articles had to be peer-reviewed and had to have a reasonable amount of citations. However, amount of citations could be compensated by newness of the article or if it explored a new subject. Moreover, after identifying some relevant literature that fulfilled the inclusion criteria, there was a form of snowballing strategy applied, which seemed to be a suitable fit to the inductive approach. Therefore, the reference lists of articles were closely reviewed for further relevant literature. Nevertheless, the inclusion criteria still had to be met.

3.3.2. Primary data

For the pre-study, three different perspectives on UIC were investigated. Purposive sampling was used to interview a student, a recent graduate that just started to work and a full-time employee with a lot of professional experience (Bell, Bryman, and Harley, 2011). The first interviewee was an Innovation and Industrial Management student. She was interviewed because

3. Methodology

she has academic knowledge about innovation. I wanted to investigate how she can apply her knowledge when collaborating with companies, especially since she has a job in quality management and is responsible for improving the current processes and implementing new ones. Furthermore, she founded her own start-up, which was considered as an indicator of innovative thinking, and it was investigated what had led her to found her own start-up and if previous UIC had an impact. Furthermore, a solution architect at the US based open source company Red Hat was interviewed. Red Hat is the largest open source company in the world. They build and support open source products from open source projects. As an open organization they value collaboration and community and it was investigated if students contribute to Red Hat's innovativeness. Furthermore, a recent graduate was interviewed, who just started working for SAP as a Data Scientist & Software Developer at Eureka By SAP S/4HANA. He was interviewed, because he is a recent graduate and I expected him to have interesting insights on UIC because he still has the student perspective, but also the industry perspective.

Since the chosen research approach in the pre-study was successful, I chose to also use the same approach for my main research project. Respondents from the three main types of parties involved in UIC were sampled. Academics, company representatives and (former) students. Interview partners were selected that have been involved in UIC before to ensure that they could contribute to the theoretical understanding of UIC and its effect on innovative thinking among students. I decided to interview recent university graduates who just started their first job, because they have the student perspective in fresh memory, but are also starting to get some experience of working life, which puts their experiences into perspective and they had time to reflect on their experiences they had made as a student. So, I used purposive sampling (Bell, Bryman, and Harley, 2011). Since it is a non-probability sampling approach, the generalizability of the results to a population were limited, but given the limited time of the research project generalizability would be limited anyway. Therefore, it is more useful to discover the different perspectives and then in further research the perspectives can be explored in more depth. Furthermore, snowball sampling was also part of the data collection (Bell, Bryman, and Harley, 2011). For setting up interviews in the USA, Swedish interviewees were asked for contacts in the USA and the contact person at the University of California, Irvine was asked if she could provide access to some of her colleagues.

As stated before, a qualitative approach was used for this research project. To collect data, semi-structured interviews were conducted. Completely unstructured interviews were not conducted to ensure a reasonable trade-off between structure, focus and flexibility (Bell, Bryman, and Harley, 2011). I had a clear focus what research question I wanted to study from the beginning, but I still wanted to be able to depart from my pre-set questions when I felt that the interviewee mentioned an interesting aspect for answering my research question. In this case, semi-structured interviews were more appropriate (ibid.). Furthermore, information about the interviewees was collected before creating the interview guide in order to ask relevant and interesting questions. The basic interview guide was adapted for each interviewee. The basic structure of the interview guide created for the pre-study was used, but more questions were

3. Methodology

added. Hence, the basic structure of the interview guide was the following. Short summary of the person's background, their experience with working with students/companies, what the motivation was to collaborate, how university knowledge can be applied in the "real world", if there are synergy effects between university and industry knowledge, if students have new ideas and if they are implemented. The interview guide used for the interview with L1 can be found in Appendix D to give an example. In addition, I used the results of my pre-study not only as guidance for my literature review, but also for the creation for the questionnaire for this research project. The results gave me an indication on what aspects I should focus on in order to find meaningful answers to the research questions. There is going to be a short overview of my pre-study results in the data analysis section to explain how it influenced the main research project.

I collected data about UIC in Sweden and the USA to get more universal data about UIC that is not only applicable to Sweden. I chose the USA, specifically California, for the comparison based on the results of my pre-study. One of the topics the Red Hat solution architect and me talked about during the interview were innovation labs and innovation hubs as new ways of generating innovations. I did some additional research about this topic and discovered that this is a great opportunity for universities and especially students to collaborate with companies and that it is well established in the USA. The other interviewee, who just started working at a newly founded department of the company SAP in Newport Beach, California told me more about why SAP wanted to have an office there. The innovation center was opened in Newport Beach due to the strong density of universities there and SAP has close ties to the University of California, Irvine (UCI) in the neighboring city. Not only is UCI located at the very center of Orange County's technological hub, but they also founded UCI Beall Applied Innovation, which consists of different programs to connect UCI and the business community. UCI Beall Applied Innovation brings campus-based inventions and entrepreneurship together with Orange County's vibrant business community. Furthermore, it is an initiative so that students can learn more about innovation and entrepreneurship. UCI is known for fostering a culture of innovation and entrepreneurial spirit and I investigated if all this influences the students' innovative thinking.

Interviews with representatives from UCI Beall Applied Innovation were conducted. A graduate student that has participated in several UCI Beall Applied innovation programs was also interviewed. Furthermore, to investigate the US industry perspective, an innovation advisor from industry supporting UCI students with his knowledge was interviewed. Therefore, the statements made about UCI Beall Applied Innovation are based on the observations from the conducted interviews. Moreover, I interviewed two industry representatives that have close ties to Silicon Valley, the San Francisco Bay Area and the universities there. Areas, which are both well known for their innovation spirit and innovative companies.

The interviewed companies in Sweden were partner companies of First to Know. Therefore, it could be ensured that the interviewed company representatives have experience with UIC and that they can share their opinion regarding the role First to Know plays for UIC. Furthermore, I interviewed two young professionals (they have worked for less than five years)

3. Methodology

that collaborated with First to Know in the past to ensure that they have experience with UIC and that they can give me their opinion regarding the role First to Know plays for UIC from the student perspective. Moreover, I was able to connect with recent graduates from a master program at Chalmers University through an innovation workshop I participated in. I chose to interview recent graduates from that master program, because it includes one year of innovation project work. The students learn about innovation and innovation tools during the first year and then they work for one year at a company and develop an innovation project for them. The university representatives that I interviewed have also worked together with First to Know in the past to ensure that they have experience with UIC and can give their opinion regarding the role First to Know plays for UIC. The university representatives were from different departments from the University of Gothenburg to get a comprehensive overview.

Table 3.1.: Perspectives of the respondents

	Student	Industry	University
Sweden		SL1	U_1
		SL2	U_2
	S_1		IU_1
	S_2	L1	
	S_3	L2	
	S_4	L3	
USA	S_5		IU_2
			IU_3
		L4	U_3
			U_4

In Table 3.1 it is explained, which different perspectives the respondents represent and from which country they are. The respondent IDs follow a simple logic. The student respondents are named with an S followed by a number. The industry respondents get an I followed by a number and the university respondent get a U followed by a number. There are some respondents that had information about two perspectives. SL1 for example is a young professional that had some insights on the student and industry perspective because he is already working. IU_1 for example started working as a lecturer and researcher after graduation and became a consultant a few years later. Therefore, she could provide insights on the industry and university perspective. The details about the different respondents can be found in Table 3.2.

3.4. Data analysis

I was allowed to record my interviews and transcribed all of them. The transcripts can be found in Appendix E. I transcribed my interviews because it allowed me a more thorough examination of what my interviewees had said. Furthermore, I aimed to be objective in my analysis and to minimize the intuitive interpretations of what people said during interviews (Bell, Bryman, and

3. Methodology

Table 3.2.: Details about the respondents

Name	Details
S_1	MSc in Entrepreneurship & Business Design at Chalmers University, Innovation Consultant at Pollen AB
S_2	MSc in Entrepreneurship & Business Design at Chalmers University, Business Developer at Göteborgs Stads Parkering AB
S_3	MSc in Entrepreneurship & Business Design at Chalmers University, Customer Success Manager at Hives.co
S_4	MSc in Entrepreneurship & Business Design at Chalmers University, Management Consultant at Capgemini Invent
S_5	PhD student in Engineering & Fellow at UCI Beall Applied Innovation
SL1	International Business Developer at Business Sweden
SL2	EMEA Service Delivery Lead at Autodesk
L1	Senior Project & Management Consultant at Procube AB, before at Autodesk
L2	IT Solution Architect at Atea Sverige
L3	Development Manager at Castellum
L4	Global Customer Lifecycle Marketing at Autodesk
IU_1	Strategic Experience Design Lead at KnowIt, before Lecturer for Business & Design at HDK (University of Gothenburg)
IU_2	Innovation Advisor at UCI Beall Applied Innovation
IU_3	Founder "The Innovation Agency", before Innovation Strategist at Autodesk, Inventor Autodesk Innovation Genome, Lecturer at UC Berkeley, Stanford & Singularity University
U_1	Lecturer for Innovation and Entrepreneurship at University of Gothenburg
U_2	Lecturer for Design at HDK (University of Gothenburg)
U_3	Industry Contract Officer at UCI Beall Applied Innovation
U_4	Entrepreneur Experiences Coordinator at UCI Beall Applied Innovation

Harley, 2018). Moreover, I did not want to make decisions about the analysis and what to include that early in the process. I wanted to have the whole transcript in order to be able to connect aspects and topics. Relationships I might not have detected from just listening to the audio. One disadvantage was that the transcribing process was very time-consuming, and that I had a lot of text to analyze. Nevertheless, it was worth it and allowed me to conduct a thorough data analysis. I conducted an extensive literature review before conducting my interviews. Therefore, I used predetermined codes based on theory, literature and my interview questions (Bell, Bryman, and Harley, 2011). Furthermore, I used emerging codes that appeared directly from the data, without any theoretical preconceptions when the predetermined codes were not appropriate for some collected information. My first step was to break down the data into pre-determined or emerging codes. I did that by using the software program for qualitative data analysis "Nvivo". Then I compared and categorized initial codes across interviews. The formulation was kept

3. Methodology

close to what the interviewee had said to minimize subjective interpretations. In a second step, themes were formed by combining related codes in order to be able to compare themes and to identify relationship among themes. When applicable, two or more themes were categorized into one aggregated theme. After that, the themes were reviewed and their relevance ensured for answering the research questions. The themes were refined when necessary. A detailed overview of the codes, themes and aggregated themes created with “Nvivo” can be found in Appendix C.

Thematic analysis was used for analyzing the data. The advantage of the thematic analysis is that it is flexible and easy to understand. Furthermore, it can be applied to most types of research questions and data collection methods like interviews, which is the source of data for the research project (Bell, Bryman, and Harley, 2018). The disadvantage of thematic analysis is that the choices regarding codes and themes could have been subjective to some extent. In order to minimize this bias, I tried to be as objective as possible. Another disadvantage of the thematic analysis is the possibility of losing the context in which the data was generated. Hence, the program “NVivo” was used, which helped to keep an overview over the transcripts to minimize that risk. An advantage is that thematic analysis does not require theoretical saturation and iterative analysis like grounded theory, which is difficult for an assignment like this with a limited time horizon (Bell, Bryman, and Harley, 2011; Suddaby, 2006). Nevertheless, I collected and analyzed my data in an iterative manner to some extent. I started my analysis after I had collected some data to let my results influence the next steps in my data collection. It was useful to work in an iterative manner and to review and adapt the theoretical framework if necessary, as new insights arose. Moreover, the iterative data analysis allowed me to determine better, if I was approaching theoretical saturation.

3.5. Research quality

The quality of qualitative research is widely discussed. The most common research quality criteria are reliability and validity in quantitative research (Bell, Bryman, and Harley, 2011). Reliability is about the repeatability of study results, whereas validity is applied to assess the integrity of the conclusions drawn from the conducted research (ibid.). When applying these quality criteria for qualitative research they have to be adapted (ibid.). In this case, it is not just about measurement issues (ibid.). Hence, LeCompte and Goetz (1982)’s assessment of external reliability, internal reliability, internal validity and external validity was used to assess the quality of this qualitative research. In addition, the criteria “trustworthiness” and “authenticity” proposed by Guba, Lincoln, et al. (1994) and Lincoln and Guba (1985) were used to evaluate this qualitative research. Trustworthiness is determined by four criteria (ibid.). Each criterion has an equivalent criterion in quantitative research. Credibility (internal validity), transferability (external validity), dependability (reliability) and confirmability (objectivity) (ibid.). Objectivity, which is part of confirmability, is especially important since qualitative research is known to be subjective. To minimize this, I tried to avoid personal values as far as this is possible. To increase external reliability, pre-formulated interview guides were used for the semi-structured

3. Methodology

interviews. Furthermore, a thorough and detailed methodology section was formulated. For internal reliability, thematic analysis was used for analyzing the results and direct quotes from transcripts were used in the analysis chapter. Guba, Lincoln, et al. (1994) proposed dependability as a part of reliability in qualitative research thus notes, transcripts, problem formulations, data, records, participant selections, and other records were kept during the whole process to ensure trustworthiness. This increased transparency and the possibility to replicate the research project. In addition, generalizability is important for a research to be valid (Bell, Bryman, and Harley, 2011). Therefore, the cross-sectional research design was beneficial because this design values breadth over depth, which makes it possible to get a good representation of reality (ibid.) Based on LeCompte and Goetz (1982), a similar basic structure for the interview questionnaire was used, and it was attempted to use as equal questioning during interviews as possible. This was facilitated by using pre-formulated interview guides. Moreover, to ensure both internal and external validity, it is important to have enough interviews to generalize results. However, not only the number of interviews is important, but also to have a good representation of the relevant stakeholders involved. I conducted a high number of interviews in every category and I tried to reach theoretical saturation to ensure a fair representation of reality.

4. Analysis

The following analysis chapter is divided into three main parts. The structure was kept close to the structure of Chapter 2 to have a clear overall structure, which allows a comparison between data collected from the literature and from the interviews in the discussion chapter. First, the different types of UIC investigated during this research project will be explained and compared to each other in order to understand the following analysis of the interview data. Moving forward, the results from the pre-study will be discussed and linked to the findings of the main study. Then the analysis will deep dive into the results regarding value created by UIC for the different parties involved and by what factors it can be influenced. In the end, the circle will be closed by analyzing specifically the effects of UIC on innovative thinking of students. An overview of the steps of the analysis is given in Figure 4.1.

The research study results show that the approach to UIC differs in the USA compared to Sweden. At the University of California, Irvine, which will be referred to as UCI in the following, they have founded the department called UCI Beall Applied Innovation five years ago. Since UCI is a public university there are several aspects to consider when working with industry (U_3). There are things they are not allowed to do as a public university (ibid.). So, the overall the goal by the chancellor when founding this department was to build an entrepreneurship and innovation ecosystem within UCI as well as connecting it to the entrepreneurship ecosystem within Orange County (U_4, U_3). UCI Beall Applied Innovation offers different programs and is one of the first to combine the research translation group in addition to the sponsor industry research along with all the entrepreneurship programs that are available at UCI in one central place (U_4). Students or staff, who are interested in learning more about entrepreneurship or who want to start their own company, can go there and they will help them to reach that next step. UCI Beall Applied Innovation reports directly to the chancellor and is not tied to any school at UCI. This is unique, because usually something like a center for entrepreneurship is tied to the business school for example (U_4). UCI Beall Applied Innovation is a separate entity to be able to support all the different schools on campus and all the students across disciplines (U_4). UCI Beall Applied Innovation is located at “the cove”. It is a building where all the employees are located and they also rent out space to start ups and small companies that do not have office spaces yet. The intention is to build the aforementioned ecosystem (U_4). “To gather all the innovative thinkers in the startup world” (ibid.). Furthermore, they have a venture firms representative at “the cove” as well so that they can have those interactions (ibid.). So that is the purpose of having offices for smaller companies or start up companies within that space. The start ups pay a small rental fee and they and the UCI students can have access to all the events there that are important to their learning or their experiences to help them build

4. Analysis

a network to get to the next stage. There is an event space to invite industry representatives to come and just to mingle and to network (ibid.). The idea was to build an environment where people can network and learn from each other (ibid.). They also have a maker space, so that students who are working on for example medical devices, can come in and work on their prototype (ibid.). For students it is important to be there to network, make connections, to get ideas and to get themselves out there (ibid.). In general, UCI Beall Applied Innovation does not organize projects or other cooperation between students and industry. It is more about teaching the students about innovation and entrepreneurship, to help them develop their ideas and guide them along the way to building up their own start up and in the process, they develop their innovative thinking. One program of UCI Beall Applied Innovation is for example the student startup fund, which gives micro grants to students to develop their start up. In addition, there is the “ANTreprenuer center” where students learn to develop an idea and how to take it further (U_4). Independent of UCI Beall Applied Innovation are internships. Depending on the field of study, it is common for students to do summer internships to get experience and contact to potential employers (S_5).

By contrast, the University of Gothenburg in Sweden has no centralized function for organizing UIC. Nevertheless, there are corporate advisory boards for some of the master programs (U_1). The idea is to invite alumni that are currently working in the industry to receive advice about how the programs and education could be developed, what can be provided differently or more to the students compared to other offers out there (ibid.). Except for that, the organization of UIC is mostly driven by individuals (U_1). The most common type of UIC based on the interviews were projects integrated in the curriculum of master programs. These master programs were in the field of innovation, entrepreneurship, and design. Sometimes the responsible lecturers used the help of the company “First to Know”, which is kind of a facilitator of UIC, to find suitable companies for the projects. Furthermore, some of the interviewed companies also talked about offering internships to collaborate with students.

Chalmers University in Gothenburg organizes UIC projects, which are integrated in their master program “corporate entrepreneurship”. In this case, the students learn about innovation and entrepreneurship for a year and then they are supposed to organize and lead an innovation project for a partner company for a whole year and write their master thesis about it. Moreover, Chalmers has an innovation office to nurture student entrepreneurship (S_2). The researchers, master students or PhD students, they are “pretty involved in this entrepreneurial area I would say” (ibid.). They are working on innovative ideas because they write theses for example (ibid.). So if someone at university, researcher or student, has an idea he or she can apply to Chalmers innovation office to get free consulting about anything related to their project and it is also possible that they help to get some initial funding (ibid.). Furthermore, it is also possible to apply to Chalmers venture startup (ibid.). It is an incubation process, which helps teams to reach the next step (ibid.). The team has one year and if they are eligible, they can sell shares and get people to invest in their venture (ibid.). According to the interviewee, there are a lot of processes to get help from as a person with an idea even when you are still studying (ibid.).

In addition, it is also possible that researchers with a promising ideas are matched with master students and they work together on the start up development as part of a specific track of the “corporate entrepreneurship” master. So, the students can chose if they want to do an innovation project at a company for a year or develop a start up with a researcher, if there is a match (ibid.).

All in all, one can say that UCI Beall Applied Innovation considers student entrepreneurship as a learning opportunity for students and it is more about experiencing the process than actually aiming at succeeding with the start up. Furthermore, they encourage interdisciplinary interactions because students from all disciplines can go to UCI Beall Applied Innovation. At Chalmers University, it seems like students go to the Chalmers Innovation Office if they think that they can be really successful with their start up idea. Otherwise, they learn about innovation and entrepreneurship in courses and later on during the one-year innovation project or they team up with a researcher and work on an existing start up idea. Students at the University of Gothenburg have the opportunity to work with companies during a project, but there is no support when they think about developing their own start up.

4.1. Pre-study

During the analysis of the interviews from the pre-study, 20 different themes in the interview with the Innovation and Industrial Management student (Respondent A), 15 different themes in the interview with the recent graduate (Respondent B) and 11 different themes in the interview with the Red Hat solution architect (Respondent C) were identified. Based on this, eight aggregated themes were identified. The eight aggregated themes were related to the value created by UIC and the effect of UIC on innovative thinking among students. The aggregated themes were the following. “Idea creation”, “Benefits of studying”, “Financial Gain”, “Work experience important for employable ideas”, “Collaboration leads to work experience for students”, “Personal development due to working”, “Collaboration gives new perspective on theories learned at university” and “Influence of size of company on collaboration”. A brief analysis of “Idea creation” and “Work experience important for employable ideas” was conducted, because when going back to Section 2.1.2 to the definition of innovative thinking, these two themes were the most relevant ones to answer the second research question.

All three interviewees mentioned idea creation in some form. Respondent A for example said that “university education also inspired you to create new ideas”. Nevertheless, Respondent B argued that depending on the work team “ideas are dictated by the manager” and only idea implementation was up to him when he worked as a student. However, he also said that his manager realized that there is “tons and tons of knowledge coming from the university students because in particular in his [manager’s] department meaning the internal information technology, the internal I.T., there’s let’s say a lack of motivation”. In addition, Respondent B mentioned that “many of the new ideas in that area actually come from the students that are hired”. These fresh ideas apparently help to overcome the lack of motivation because they “enhance their skill set as well as I [Respondent B] did. Right. And with that they develop new interest into the

4. Analysis

topic". SAP brought in young people with fresh ideas for starting a new product. Respondent B said that "if you're starting your new product it helps bringing in fresh ideas. And that's exactly what my what my new team now is supposed to do is start a new product with fresh ideas and do it along the guidelines of SAP but not as SAP has always done it". Respondent B also said that students are very motivated to bring in fresh ideas because in his old team for example it was "mostly the students that were really pushing for it because they really wanted to get that good standing good reputation good feedback good image because they wanted to be the ones that are remembered". One indicator that SAP believes what it claims is that in Respondent B's new team there are significantly more junior than senior positions. Nevertheless, Respondent B also revealed that the drive to implement own ideas and to try things out depends on the team and on personalities. Some employees need less guidance some need more. Idea creation also seems to depend on the level of knowledge in a team because Respondent B had less guidance because no one in the team was familiar with the topic he was dealing with. He also warned that "strong personalities that would push people very much into [...] a task rabbit [and] your suffering new creative ideas."

Respondent C agreed with the other interviewees that students have interesting ideas, but at Red Hat they have a different approach to university-industry collaboration than at SAP. At Red Hat it is more about offering students the possibility to test their abilities and ideas. For example, they did a "Hackathon" with the University of Stuttgart. The goal was to "apply [...] the knowledge, it was having fun, [...] but it was also if you have good ideas, this is a place to also have kind of a platform where you can show that you can do it and show kind of a first time your idea because there was also press invited at the end. It might be that you get some sponsors for your project ideas for the future.". Another important aspect of innovativeness is to get to know the business, to observe what trends are occurring, what is needed and what can be implemented. As Respondent A said "I usually have like a lot of ideas [...] but [...] it's more like getting a practical approach to the ideas and like figuring out what might actually work in reality because I can have like a lot of big weird ideas and then I don't really know how to connect to reality". Respondent C confirmed that by saying that "very often universities cannot keep pace with the things that are happening in the world". Nevertheless, it is essential "to understand what are the day to day problems or the day to day work and how can I help with my ideas".

All in all, this was just a short summary of the results, but it became clear that students seem to have a lot of new ideas. Partly on their own or they emerge when collaborating with companies and when observing the real business needs. Furthermore, companies seem to be interested in students' knowledge. In addition, students' fresh ideas and perspective can also motivate employees. Nevertheless, it depends on the manager how much freedom students have to create and bring in ideas. Furthermore, it also depends on students how much guidance they need. In other words, influencing factors have to be considered when investigating UIC. Based on these insights, there was more data collected on these topics through interviews conducted during the main research project. Furthermore, the aggregated themes "Personal development

4. Analysis

due to working” and “Collaboration gives new perspective on theories learned at university” were considered in the subsequent data collection, because these aggregated themes hinted at other valuable insights on innovative thinking among students due to UIC. For example, developing your own start-up and having ideas for that requires self-confidence. Therefore, “Personal development due to working” could have a positive impact on innovative thinking. Furthermore, “Collaboration gives new perspective on theories learned at university” could have a significant influence on innovative thinking when students learn how to apply and test theory in practice. When observing the application of theories that were learned at the university in practice students could have ideas about how theories could be applied better or how other theories could be applied in a new way. Moreover, the aggregated theme “Influence of size of company on collaboration” was identified, which implied that the size of the company has an influence on UIC. The main research project gave the opportunity to investigate this further.

In the following, the results of the data analysis from the main research project will be outlined. As mentioned before, the following analysis chapter is divided into three main parts. The structure was kept close to the structure of Chapter 2 to have a clear overall structure, which allows a comparison between data collected from the literature and from the interviews in the discussion chapter. For each of the following sections, the relevant data from the interviews was put together and discussed if there were similar or opposing views on the subject. So, I did not list the interview results in a chronological order, but interrelated the respective interview parts, which were about the same topic, across interviews.

4.2. Value created by UIC

In the following, it will be analyzed what the interviewees said regarding the value that UIC creates. The chapter is divided into value generated for university, students, and industry to analyze the three perspectives in more detail and to get a comprehensive overview in the end.

4.2.1. Value generated for university

First of all, the overall goal for the University of California, Irvine when founding UCI Beall Applied Innovation was to create an ecosystem of entrepreneurs, innovators and students to develop these relationships with Orange County businesses to partly stimulating economy (U_3). From the Swedish university perspective, UIC creates value for university because they get insights into what industry does. According to IU_1, “university also always looks to have that industry perspective but that is of course not so easy for them”. Therefore, UIC seems to become a trend especially for young researchers, because “young researchers also realize that only theoretical research is not going to give you anything, it is not providing anything new” (IU_1). According to IU_1’s experience when working with researchers “they always wanted to have some kind of real-life project, some industry partners or projects to actually work with so that their research could be applied. It was very much about applied research and action research were they called, which means that you are part of a project, you are doing your research

4. Analysis

while you are working on a project but really working with a project and thinking about how can this be applied to theory or vice versa”. Furthermore, L4 said that Autodesk for example collaborates with educators because some educators want to use certain features for “teaching in the classroom or want to get out in front of industry trends”. In addition, a lot of educators have interest in “some of the more future forward features that the industry hasn’t completely adopted yet, but as educators in various post-secondary institutions, they want to be on the cutting edge so that they become the go to person for that specific technology” (L4).

Another aspect is that UIC provides university with a financial value. The creation of financial value is related to the argument before that it is important to have the industry perspective to be able to apply research results. For example, at Chalmers University a lot of researchers work with companies, because there is “a lot of research going on in the school, but if you cannot carry this academia to the industry, you cannot make money from it, which would stop you in innovating more. So, I think it’s like a circle that you need to create value, like the new research should be commercialized, get some money, create value, do something else” (S_2). In other words, universities have to work with companies and bring their knowledge to industry to make money from it and to continue to innovate like a circle of value creation. UCI for example is also approached by companies interested in licensing a certain technology. This additional income is important for public universities because in the USA they do not only want to rely on federal money (U_3). So if you consider the university as an enterprise and you want to grow it “you have to not only bring in the federal money, but you also have to look to the nonprofit sector and also the for profit sector” (ibid.). In addition, collaborating with industry is also important, because for example when considering intellectual property, if the university was to develop something in a project funded by industry “one of the ways that [they] get that innovation out to the public is ultimately by commercializing and the university doesn’t have means to commercialize a product necessarily. So, what we could do though is we could take our intellectual property and we can license it to a company. And so by having a license agreement between the universities and the company, it allows the company through a license to use, to further develop and then commercialize.”(U_3). So, UIC is important for university to receive an additional income through for example commercializing technologies and if they cannot do it on their own, they can license it to companies and they commercialize it.

UIC is also a way for university to complement the education for students. Due to UIC lecturers are able to make the education more practical and hence provide an even better learning experience and richer learning outcomes. “The more practical the education is, the more bodily, the more experiential the education is. This is my form of pedagogy in a way. The more ability to actually take these theories and move them into something new. So that’s why I’m driven to do that. And I think that it becomes all of the negotiations between all the people make it so that a really good learning experience happens. Cause even if the client doesn’t show up, that’s actually positive for the learning outcomes sometimes” (U_2). In other words, the students learn more if they can apply and test the theories, which they have learned and when they interact and negotiate with practitioners. UCI Beall Applied Innovation was also founded with the intent

4. Analysis

to provide their students with a richer learning experience. “Whether it’s a faculty or a student or staff who are interested in learning more about entrepreneurship or who wants to start their company, our department is here to help them to reach that next step” (U_4). This is very important because as S_1 summarized very well “the closer you [students] get to experience of actually being an entrepreneur, we or the faculty will see that they have succeeded in providing you with appropriate education”. Providing appropriate education is essential for university and can be used for branding among other things.

UIC can be used for branding, which is very important for university. University has to decide what it wants to be known for. Part of that can be of course good research, sustainability, but also good education (U_1). Therefore, for having good education “having this connection with companies is an important part as well” (ibid.). Part of a university’s mission is to increase the employability of students. A university degree is important for employability, but it merely “gives you an entry ticket, so it allows you to apply for certain jobs, but it doesn’t say anything about who you are, what you can do, what you can’t do what you add, what you don’t add. So, I think, working with companies from a university perspective, I think increases employability of our students. You can use these cases as a [reference]. I worked with this kind of company. We had, in one of our courses, we had this project, and this is what we solved, this is how we go, how they will do it.” (U_1). In the long run companies will know that if they hire students from this university “it’s a good hire, you will get the value for your money” (U_1). Furthermore, if it becomes well-known that this university collaborates with industry, the university will also become visible not only to the big companies like Volvo and SKF, but also to the smaller and medium sized organizations and collaborate with them, which provides a different kind of value (U_1).

To conclude, UIC provides value for university by providing industry insights, which is important for applicability of research. Especially young researchers seek to collaborate with industry to make their research more applicable. In addition, UIC also creates financial value for university due to commercialization of technology. This is in particular valuable for a public university to be not completely dependent on federal money. In addition, UIC also complements the education for students. Due to UIC, the education becomes more practical and leads to a higher learning experience and more learning outcomes. Last but not least, if a university is successful at UIC, it can also use it for branding. If a university is known for good education with also practical parts through UIC, the employability of students increases, which is an important quality measure for a university. In the following, the data regarding value generated for students will be analyzed in more detail.

4.2.2. Value generated for students

For students UIC is valuable, because it allows them to not only learn theory, but to also get practical insights. S_3 said that “we actually got to experience a lot of the things that we were reading about so we could connect what we were doing to the theory and agree or disagree with the theory in our theses, which made it possible for us to both have the experience but also to

4. Analysis

reflect on it in a very good way. Also, we had all the teachers who had been there as well, and we could talk to and have discussions with. I think we learned a lot from having that emotional experience along with the theoretical models". In other words, students seemed to profit from applying their knowledge in practice, from testing the learned theory and from reflecting on the experience. Furthermore, it seems to help to not only have the practical experience, but to also discuss it with the professors to combine theory and practice. IU_1 agreed with that and said that "for the master thesis in my school that is, there's a lot of this, the students who want to have real-life projects so that they actually did something but also of course the theoretical background and what is the theory, test the theory or see what works what doesn't work. But I think also in the last years more and more this was really a focus that they, as I say, they can try out something if theory works or not or maybe sometimes they even develop new theories". For students it appears important to apply theory in practice and to observe what happens and they might even want to develop new theories. So, students strive to question and to test what they have learned at university and might even improve it. Autodesk for example invites interns to their technology centers so that they can "sort of explore or dig a little bit deeper into their education" (L4). Furthermore, U_2 explained that "the more practical the education is, the more bodily, the more experiential the education is. This is my form of pedagogy in a way. The more ability to actually take these theories and move them into something new. So that's why I'm driven to do that". It appears like the ability to apply theory in practice and then to create something new out of it is the ultimate form of learning because creative thinking is about reinventing (U_2). U_1 agrees with that and pointed out that it is not about "training rigor academics, but it's more about training, knowledgeable practitioners. So how can you apply theory and how can you work with theory in real-life. But also, how can real-life support theory, that's also what I just want to do now in the lectures, courses that I have". To learn how to apply theory in real-life and vice versa it is essential to have the practical context.

UIC leads to real-life experience for students. It is important for students to get experience and insights into how things work (SL1). S_5 agreed with that and said that if students are only studying, they miss out on important experiences. "Any learning opportunity helps, just getting out of the lab is great" (S_5). S_1 also said that he realized in hindsight that "you can't really prepare students for the kind of experience that you're going to gain from trying to run an innovative project in organizations. And for us, we ended up being in a very, very conservative organization. And often when talking about innovation or just discussing it at school you don't discuss examples from the conservative companies. You use examples from companies that are really good at innovation". U_2 agreed with that and said that some students are questioning if the company really does well, but there are others that are "just naive, they just think that all companies work this in an innovative way". So, it is valuable for students to get this real-world experience, to experience that reality differs from the classroom. It might be frustrating and challenging to drive for example an innovation project within a large company, to try ideas out firsthand, but "looking in the rear mirror it was a really good experience" (S_3). These experiences help the students to build a mindset preparing them for the future (S_2).

4. Analysis

Making these real-life experiences is important for their future career, because projects teach students that some employees are interested in new projects, but others might feel threatened by what the project might uncover. S_3, for example, made the experience that “people who worked in the company in general were super interested and we had some people in our department who were super interested in what we actually learned and what we saw within the organization. Then we had some other people in the organization who I think were, they weren’t expressing really that they were interested and I’m not sure if that was, they didn’t have time or if they were afraid of what we were discovering. We can say that people who were not very much affected personally of what we were discovering were more interested than people who were personally very involved”. For S_3, “it was sometimes very difficult to have decisions made or to have budget or to, you know, have a full overview over the organization and everyone who you need to talk to and so on. So, there were a lot of different challenges connected to driving innovation within any large company, basically to try out firsthand, which was at the time really frustrating.”. So, it is essential for students to make these experiences and to learn how to handle them for driving an innovation project. For example, for S_4 that was exactly what he wanted to get out of the master program, because he “wanted to work with consulting and I wanted to get kind of a new perspective on how to deal with innovation within a large corporation”.

In addition, these real-life projects can also teach students to evaluate, if there are other factors that influence the course of the project and how interested employees are. For example, S_3 realized that “there was a lot of turbulence that didn’t really have to do with us in the department where we were and I think maybe listening to also what we had discovered might have increased that. So that might have been the reason for not wanting to hear what we had to say sometimes”. Furthermore, there could be also other factors that can influence the success of projects. Social relations are for example fundamental. L_2, for instance, stated that his “experience is that the social relation is a very, very, very fundamental core when you are creating trust on a market. Could be one of the things that you could maybe grasp better if you work with companies and get in touch with companies when you are doing your masters. So, because I mean this, you’ll have read some books in that subject on the university. But also, I mean stories, storytelling from real-life is sometimes another dimension for the students to, it is another way to grasping that reality”. L_3 agreed with that and said that students have to experience the complexity of things in real-life, which cannot be taught at university. Students need to “work with real things, real problems and see the complexity, because things get more and more complex, more and more advanced. It’s more and more perspectives and this is good, but if we don’t train students in order to see that, they think, I’m a really good engineer, I know everything about the engine and then you understand, as I say, when you work, I’m educated in innovation but this people issue, this culture issue. You can have the best process in the world. You can know everything about every process, or the big company has done. You can be a lean expert in the model. When you end up with the 15 employees who are 63-year-old with white hair and say, Oh, we tried that before, it’s no idea. Then it’s different” (L_3). There are factors influencing a project, which have nothing to do with education or knowledge and it is important

4. Analysis

for students to learn about that in order to figure out how to handle it.

S₁ appreciated these real-world learnings in hind sight, because it prepares students for starting their professional careers. In his opinion, “there is a transition between your studies and when you start to work. There’s something that we need to go through there and having the possibility to combine those two like doing some running an actual innovation project while at the same time being back in the context. That’s a good way to start the transition. It’s a bit like these trainee programs, I guess that a lot of people apply for after their studies are done. A combination of continuing to learn stuff and focus on education while at the same time do some actual work”. According to S₁, the combination of gaining work experience, while still being a student helps to ease the transition. Otherwise the transition can be very difficult and new graduates could be overwhelmed by the challenges you encounter and the high responsibility they suddenly have. From S₁’s experience “you will face some challenges when you’re starting to work that you didn’t face when you were studying. Cause when you’re studying you only have yourself to think about, you only have like the only consequences if something goes bad. It’s your own. If you fail an exam that’s on you but it doesn’t have any consequences for anyone else. So, the only responsibility you have is towards yourself and when you start to work, you will notice that what I do have an impact for people around me as well. I have expectations put on me by an external party and not just by myself. And that is something, at least I had to adapt to and speaking to a lot of friends as well who’s recently graduated. There is a transition being just handling the kind of responsibility that comes with having an employment compared to university studies. And I think that the more you can ease into that the better. So, providing some practical knowledge or like some practical experiences during your studies I think is always a good thing”.

Moreover, if students made practical experiences during their studies they are better equipped for starting to work right away because, for example S₁ comes from a civil engineering background and he said that the transition is “quite extreme because in a lot of cases, you get out of school and you end up in a company where they tell you, okay, now your real education starts, what you learned in school isn’t really worth anything, it’s just a receipt of getting through something that is difficult, but now you will actually learn what it is that you’re supposed to apply in your employment. And I think a lot of people are shocked when they go from school and get out to like a construction site and are supposed to lead construction workers, which they haven’t had any experience with or got to know the industry or even like set their foot in a construction site before, it’s going to be very difficult for them. So, the more practical knowledge, we can provide them during the studies, the better”. This observation also connects back to the previously mentioned experience of U₁ on p.46. He stated that it is valuable for university to enable students to gain practical experiences during their studies. If students already make practical experiences during their studies, they perform better during their first job and companies are more satisfied and student employability of that university might go up. IU₁ also agreed that it is very important for students to get these real-life insights during their studies, because students are “often so far off from the reality. Because we have seen it often with

4. Analysis

students that they come to the company and and they've been pretentious and naive to think I can do everything and without putting any effort in. So when you're working with these kinds of collaborations you definitely get a hinge of how it is in real-life, you probably also develop some kind of humbleness because you realize not everything is possible in a week. So, for the students the most relevant thing is just to be faced with real-life challenges and also often with organizational politics and structures, which are unfortunately very impactful". IU_2 agreed with the assessment that students coming out of the school environment are kind of naive and miss the real-world perspective. Therefore, it is important for them to maybe fail with a start up idea for example, because "they just learn a lot of these lessons that makes it, it just gives them the background so they can move forward cause they're just so naive coming out of, you know, school environment and academic environment. They don't understand how the world really works and what's really involved in all the little issues you'd come up with" (IU_2). In addition, U_2 also mentioned that sometimes she receives messages on LinkedIn from previous students telling her that they were very frustrated and angry during the real-life projects, but now they are very thankful for what they learned, because it prepared them well for their first job.

Furthermore, it is not only about the hands-on experience, but also about being inspired and meeting interesting people. L_1, for example, mentioned that it was about "working with us to get the inspiration of what is like working in a global company, meet people with different backgrounds". Nevertheless, for S_2 this hands-on experience of working at a company full-time and having the responsibility for a whole innovation project was the most valuable experience. She said that "we were like literally working at the company. So, which was a pretty, I would say positive experience and you're pretty hands on like you are leading a project literally. So, which as a pretty junior person it is a huge privilege like you are leading this innovation project. You are leading everything from finances like everything so I think it was pretty let's say hands on and a good experience that is given like cause to be able to be in that position later in your career. You should, I don't know at least work for 10, 15 years I guess to kind of run your own thing in the organization. I think in that case it was like a pretty good position to start at" (S_2).

Moreover, these real-life projects also help students to develop themselves. U_2 said for example that "this kind of work, it's kinda, it's against the grain. It's like telling managers that they've been doing things stupidly, it is intense to be the person kind of bringing it up. You know, a lot of it is training. They're like, okay, no, I'm right. And it's with people who are used to being right, like head doctors there is a lot of like hierarchies at play there". So, it is important for students to train that, especially in a setting where they have not that much to lose yet. S_3 agreed with that and said that she "learned a lot about myself because both I had to be strong in what I knew to be able to contribute. I also needed to listen a lot to be able to learn from others who had other experiences and I also got very frustrated sometimes, which was a big experience and learning how to put that aside when needed but also to speak up when needed was the variance. So, I learned both a lot like on the of the subject. And I

4. Analysis

also learned a lot about, you know, what my colleagues and friends knew but also learned a lot about myself, which was a very good thing. I think that almost helped the most right now cause that is something you can't really Google". The students grow and develop themselves during the projects, they become more self-confident but also open to learn from others. This personal development is an important asset to obtain, because like S_3 said that is something that takes time and experience.

Collecting these experiences while still studying is beneficial, because students still get the support of supervisors from university and company. "Faculty they, they want to be as little involved as possible as well. But they offer the support that is needed for the project to actually succeed. So for every student team you have like a steering group, we had a representative from one representative from the faculty, one representative from the company and an external representative that you as a student team recruit on your own. So, it's kind of an advisory team and you have like regular meetings with this steering group to make sure that the project is progressing as it should. And I do think that that is one of the strengths within this program. It's that the faculty actually puts you in a situation that is supposed to be as close to reality as possible and not something that is adapted to a couple of students coming to do their master thesis" (S_1). The students can still make their experiences and try things out, but they have someone in the background they can consult if they do not know what to do. S_3 said that they "had a supervisor who tried to give some feedback and tried to help and he really wanted to help in a good way, which was awesome, but it was very much about thinking for ourselves and seeing what happened when we did certain things".

Furthermore, UIC is a good opportunity for students to create connections. SI_2, for example, said that "when I came to Sweden, we got all these opportunities to work with Stena line or Volvo, Innovation group and or, yeah, a lot of different companies. So that obviously created a lot of connections". Within UCI Beall Applied Innovation, the Innovation advisor network is a great resource for students, which can help to put the student start ups in touch with different company representatives. IU_2 said that "we can get them into just about anybody in any company in orange County because you just have to put the word out within a couple of days. You find somebody that knows somebody that knows the CPO or knows the VP of marketing of that, you know, whoever you're trying to reach and this becomes a powerful tool for the startups to take advantage of because they can tap in to all the knowledge. It's in the, you know, it's surrounding us". In addition, when collaborating with companies, students also get the chance to find a mentor and this mentorship can last for a long time (L_1).

In addition, students can use UIC to get to know potential employers. Students can use it as an opportunity to convince the employers of their capabilities. L_1 for example said that "one of the people I hired was a master student and they did a master thesis based on a global launch project that my team did". Furthermore, U_1 agreed and said that "it is a great way just to kind of like support students with like, okay, this is who I am, this is what I can do. Like please hire me". On the other hand, students can use UIC as an opportunity to get to know an employer in more detail and decide if that industry and that company is the right fit. L_3 recommended

4. Analysis

students to be very critical of companies and to question what the company does to figure out if the student wants to work for that company. He said that “you can get a perspective, and I tell this to a lot of students. All the companies talk about culture. We think culture is really important. We have four words that are value words. You get the chance to know them. See what they actually do, you get closer to see and that I hope makes it easier for you [students] in the future to ask the right type of questions. Do you get the chance to be in a place where you actually get to develop the things that are important to you? Maybe also you think that you want to work for real estate company and when you come to the real estate company, this is in theory, yes. But this is not what I want to do”.

All in all, UIC creates value for students, because they can apply and test theory in practice and might even develop it further. In addition, students gain real-life experience, which is important for their future career and also for their personal development. Making these experiences, while still studying is beneficial, because then the students can still get support from university or company advisors and they do not have anything to lose compared to later on in working life. In addition, students can use UIC to build their network and to create connections. They might even get the chance to meet a company that they are interested to work for after they graduate. Then they have the chance to get to know how the company works, if it is a fit and then use the chance to convince the company that it would be beneficial for them to hire them.

4.2.3. Value generated for industry

First of all, UIC provides value for industry because universities provide networks of connections, knowledge of the latest technology and the strive to innovate. The development mindset of R&D is core of universities. L2 said that “the university always represent some kind of reflection and also have an established network of connections that also are useful for us. If we are, if we can use them in a proper way, in a decent way. And also, some of the forums that will be set up by the university. So, we are invited, we always have a good meeting place I think. And also, the strive for always innovating and always develop, the mindset that is research and development is core of universities. That’s also interesting for us and needed. I mean, that’s a lot of things, I mean relations networks, of course knowledge, knowledge of the latest in technology and so on. That’s also interesting and important for us”. Furthermore, also L4 mentioned that UIC is important for companies to get access to new knowledge and what will be relevant in the future. He said that “a lot of times institutions, universities are doing research right. And they have some insights into future work or future making that maybe we haven’t seen or, you know, they might have more of a pulse on one way or another. So, it’s for us to be working with those institutions as well”. So far, the value created by UIC in general was analyzed. In the following, the value created by UIC when students are involved will be analyzed.

One value created by UIC when students are involved is that companies get access to knowledge. Companies want to learn about innovation processes and design from students (U_2). Furthermore, SL2 said that “the experience that I have from all the projects that I’ve been involved in. Regardless of if it was me, myself in school in Gothenburg or me with First to Know

4. Analysis

and all the students and the companies, I mean the students are coming in and they are, I mean it just shows how easy it is for them to put theory into practice because they go to school for a couple of days a week and then the rest of the week they work with the companies on projects and they like, they're encouraged to bring out of the classroom what you're learning and put it directly into practice because they need to obviously in some projects and then the companies are getting like the new theory at least. I mean, obviously I know something, my manager knows something, but it's more practical models. I mean, it's not like we're reading the latest journals or articles or so". In other words, through the interaction with students, companies learn about the latest discoveries and achievements in research and they also have the students that connect theory and practice for them. Especially master students have a deeper knowledge (I-1).

In addition, students can teach companies new innovation tools and new approaches like for example agile working or the business model canvas. S_4 mentioned that "there are things that we learned in these master programs that are fairly new to people. I mean, this whole notion of working in an agile way and working with the business model canvas and tweaking the customer's value proposition and so on. I mean, that's something that is fairly new to companies. And I think when you get students coming in, you know, and we had sessions where we talked about our tools and our approach and everything and I think that's something that we could really, we could be helpful in kind of learning or teaching them how, how they could use some tools. I would say those are maybe the most, the biggest reasons I would say to collaborate with students". Moreover, technology keeps changing faster and faster and companies need new perspectives, new mindsets to keep up. S_2 mentioned a research that she had conducted, and the results showed that the average age of companies is decreasing. Technologies keep evolving so if the company does not adapt it goes out of market (ibid.). S_2 assumed that the companies "are also aware that the market is changing. So, they need to do something. And mostly, especially in the big companies, like they're so used to all these big processes and the same mindsets so they are stuck in this mindset". Therefore in her opinion, people that have no idea about your company, who have a different thinking give the best feedback "because they have no idea. So they will bring new perspectives and I will say especially in Sweden a lot of companies are aware that they might not be in the market tomorrow so they need to do something. I think that's why it's pushing them" to work with students (S_2). In the USA, it is also common to hire students to get access to their knowledge. S_5 for example mentioned a friend of hers, who works part time for the company Skyworks and "is doing his PhD in electromagnetism. Skyworks is a company that does circuits and basically it's an electrical engineering company. So, what he does, he uses the same basic knowledge that he has from his degree and he applies it in the R&D department of Skyworks. So, they definitely use them as like a good resource". Furthermore, Autodesk provides products for free for students and educators to prepare them for entering the workforce and to get feedback from them to ensure that Autodesk provides the right content (I-4).

Another value that student bring to industry are inspiration and energy. Companies can not only benefit and learn from students' expertise and knowledge, but also form their eagerness to do something good and to learn. S_3 said that "I really think that we could benefit from having

4. Analysis

people from the outside coming in with their expertise and knowledge. And I think master's students are a very good source of both knowledge and eagerness to do something good and to learn. And I think that is both something that of course companies can use, but it's also an attitude that companies really could use. So, I think bringing that into the organization is a very big value with having students there, having someone who looks at new ways and has that energy to learn and to ask questions, that's a very good thing". Students bring in interest, energy, and curiosity. According to L2 "the interest and the energy from students without any heavy backpacks, all the tradition and culture is one of the benefits I think and also the interest and curiosity from students is asking brand new questions. One really good asset when you are working with students, they are asking new questions. Often we find ourselves asking and answering the questions in the same sentence we are so familiar with, with everything we are doing. So, we would keep on answering the same questions over and over again. So, we need new questions. That's one big advantage of working with students". So students are not affected by previous way of thought and ask brand new questions or as U_2 put it "the students have more freedom to look at the problems from up from down and flip it over and they don't have the same, like they're not like indoctrinated into the, like they're suspicious of the company instead of the doctrine". Moreover, U_2 pointed out that students can help a team that tries to push something new in the company. She said that "especially if it's one team in a large company, it's a group that's trying to be kind of against the grain of the larger culture. And so they need some extra energy for that".

In addition, students help to inspire employees, but to what extent also depends on the employee. IU_1 experienced that students "help more to inspire with the results or even during the project with the collaboration because the thing is that the consultants when they work with the students they can never on the spot implement some of the ideas or do anything with the ideas because they are having their own project often. But of course, they can be inspired by these reflective sessions, by the ideas of the students, by their time they spend with the students. So, I think it is more an inspiration and then it depends very much on the employee itself, how open this person is to be inspired". L_1 agreed with that and said that he enjoys "being with young people, I really like spending time with people. I like spending time with old people, but young people always inspire me, to see the happiness and sort of the wish to accomplish something". In addition, he said that "the biggest value is for the company they work for. If they understand, I mean they give you energy, they bring ideas that you probably didn't think of. I think energy is good". U_2 confirmed that based on the feedback she got from her partner companies. The companies "want to collaborate with students because they bring a boost of energy" (U_2). In addition, students bring diversity into teams. SL_1, for example thought that "it's always good to have a good mix of age and diversity in general and that is one thing that they definitely bring. So, if it's not, the student doesn't necessarily have to be young, but typically they would be, in this case, I would say a bit younger at least like the average person in the company. And also it might be a person that isn't as, in our case since we are based abroad, and might also be a person that most likely haven't been as exposed to that a bit

4. Analysis

more fresh, so to speak, to living abroad in that sense. Which is also an interesting side both for them to learn like how that is and also for us to keep that in mind because all of our clients for instance are Swedish companies and Swedish people. So, we don't lose that foothold as well. I think that's a good aspect to bring in". U_1's thoughts went into a similar direction and he said that it is good to have "a few pairs of fresh eyes on looking into materials. Students normally think differently than the company. So that's also kind of like a good thing". In addition, L_1 confirmed these thoughts and said that "after having worked in global organizations I realized that the more you mix and match, the better the outcome".

Students' fresh perspective and reflection is also another value of UIC for industry. The reflective element of student projects is very valuable. Students question why a company is doing something and how it could be beneficial to apply theory. So what S_3 did during her collaboration was "reflecting about how the work was done and also how it was done in comparison to the rest of the organization and how the work actually fit into the organization. So I think they got kind of two consultancy projects basically done by students. One of them was actually the project that we delivered with the prototype and the business case and the other one was a reflection of basically how they were doing with their innovation work". IU_1 agreed that what companies want is this "reflective element of the student's research because the students reflect, they have like 10 interviews and then reflect what everybody said and then mix it with some other theory or industry, some other interviews and then you have this conclusion, and if you package this in a good way and give it back to the company, the company might learn something new". This reflective element is especially important, because companies "never have time to even reflect about our methods about our projects because in consultancy life you basically just do and do and you do try to not get stressed. But once the students are coming in, they give you the opportunity to... So first of all, they reflect about what you tell them and what they hear. But also, you reflect together with them in an interview situation for example. And you also hardly ever, you know would take an hour per week with your colleagues sitting together reflecting about what you are doing. So, the students basically force you to do that, which is very good" (IU_1). So, students bring in this reflective element and reflect by themselves about what they have observed, but they also encourage the employees to rethink their behavior and work. S_4 agreed that "it's beneficial, I think as much as much new, new fresh minds and curiosity and creativity as possible in any angle". Nevertheless, he also said that it depends on the company type and industry if it makes sense to collaborate with students. In his opinion, it would "fit more to a company that is creating some product maybe or that is a bit more, you know, that they have their own processes or products that they sell rather than that you come in as a student to a consultancy helping others".

Furthermore, students like to be innovative, they dare to question which leads to progress and companies profit from that. L_2 enjoys collaborating with students, because they "dare to question, dare just answer those stupid questions, because this is, those are the ones who will take you forth, bringing you forward in your progress. I think students like to be innovative of course, absolutely. They need to be, I think pretty much questioning status quo. Disruption in

4. Analysis

a positive way is always big drivers for innovation. I mean, not extreme revolutionary thinking. I mean disruption in a positive way. Maybe you have an idea, maybe you see this bad result, inefficiency, be a little bit disruptive and say 'but if', and then you start to work. I think students have a lot of that. Also, I mean an asset and a benefit of working with students. They question. I mean you have spent five years at the university questioning all the time, so you're pretty much prepared and trained in these subjects. So still curious state of questioning". Moreover, students "not only provide us with things they think we like to hear and I think there is just a good possibility that they could ask questions that have never been asked before and that is maybe the most valuable thing they are doing" (L2). In other words, students help a company to progress because they question the status quo and make the companies rethink what they are doing. Students do not mind to tell a company what they think. L3 agreed with L2 and said that students question a lot and "that's the best way to get better, when you are actually challenged". Nevertheless, L3 also adds for consideration that not all employees are open to that and not all employees can be exchanged, but at least giving them a new perspective helps. U2 added that students' insights can also have a real impact because the students usually build a good business case with good arguments that can be presented to higher management. She said that "I find that my students create really good arguments for them to go to their boss and their boss's boss or their boss's boss's boss. So, it's like kind of a really good positioning in a way". In the USA, interns also cause other employees to rethink their work. L4 said that "I've seen some really innovative thinking coming from the interns that sort of causes the rest of us to rethink about how we do our work. And a lot of that is they have the leeway to do that, that type of exploration". L4 mentioned that the students have the leeway to question things. This connects to the next aspect, which might explain why students have this leeway.

Students have a non-threatening position in the company and therefore have more freedom to ask questions. Students can provide managers with valuable insights and feedback about projects, methods, processes, and the manager as a person, because employees are more honest when talking to students than when talking with their manager. L1 said that the "master students we worked with, their job was to analyze what we did. Come back with feedback on what has worked, did not work. What can be improved and what we shouldn't do again. So, they came up with some really good stuff because when they interview people they can give different feedback than I did because I was leading the project, but they didn't say everything to me, but they told them. So, the feedback about the project, the methodology, the processes, me as a person etc. Because even if you encourage people to be honest about you as a manager, you won't get the full picture. It takes a long time until you will get that". L3 had the same experience and said that the "threat level is so much lower when students are questioning what they do and it's not as bad when students question one of my employees, why do you do that? As when I do it as the boss". Furthermore, students ask questions and are not scared of telling the truth about what they find. Furthermore, students are also not as close to the project than employees and have a different perspective. SL2 said that in his experience "students usually don't feel like scared. They just don't have fear to tell it as it is because they come in for a short

4. Analysis

while, they ask some questions, do some digging, and then they come back and say, this is what we found out. Like this is how we experience it. And maybe it's a completely new vision for somebody who's just too close to understand it. So, I think at all points it's valuable to bring in students". S_1 confirmed that and said that as a student "since you're not an entry at the company, you don't have that much to lose. Right? Because if you fail, you will still get your graduation and you still get your master thesis and so forth. So the consequences are nonexistent really and maybe you won't get the project that you expected or the results organizationally that you wanted but the actual downside of failing is quite small and if you were to run an innovation project as an employee instead, like within the organization, the consequences of failing would probably be quite much higher. And that is like proven over and over that the psychological safety that is needed, to actually have the corporate culture that is accepting more accepting towards running failed projects. And I think that as students surrounding these kinds of projects, you would get the unique opportunity to be fearless and to dare to be radical and dare to actually challenge the company and to ask additional questions because you don't have to worry about getting fired". Therefore, it is beneficial for companies to collaborate with students before they graduate and not only hire graduates.

Furthermore, the financial aspects are also a reason for working with students. While SI_1 argued that for his company student collaboration is not for "for cheap labor not at all. It would rather be to give an opportunity to the students", other interviewees mentioned the financial advantages that students can provide for industry. S_3 , for example said that "I'm not sure exactly what was their initial thought, but I think it's kind of cheap having two people working for that little amount of money for an entire year on something that could provide value for them. So, I think that's probably it". The company gets a team of students spending a lot of time thinking about the issue, whereas a consultant would cost a lot of money. U_2 said that "the thing that I get to offer is a team of five working 40 hours a week for a certain amount of time. Thinking about it from a very particular direction but still not, this is if it was consultants it would cost. Like if they had me do it, it would cost a lot of money". S_3 also pointed out that the company got "kind of two consultancy projects basically done by students".

Moreover, students are essential for companies to prepare for the future. Students are the key to understand tomorrow's market and consumers. In the opinion of L_2 "to keep up with the markets that we are close to, the consumers thinking and the users thinking and the demands. It's a transformational power from the production line to consumers and I think that's obvious and I think your [students'] generation is pretty much already in that. I think you don't buy because some from the industry say you should buy it. You have a need and you communicate your need and you know where to find things. You know how to benchmark, and you know, how to validate the information much better than my generation. So, I think this is already happening. So, academy students more than professors and researchers are our assets when it comes to understand tomorrow's markets". This argumentation is also valid for the US companies. L_4 said that Autodesk wants to be able to be "thought leaders in the future of work and future of making things. And to do that we need to have close connections with folks who

4. Analysis

are learning this stuff in the education system or teaching it in the education system”.

In addition, companies can also use UIC for branding and attracting talent. Student projects can be used for changing the brand image. S_4, for example said that “in terms of a brand, a brand image. I would say. I think just a matter of fact that you have a company that can many times be perceived as the, you know, very stiff and old school or maybe not so much happening. We had one company that was part of that was a public sector company. So, I mean, I think that’s one part that you, that you really want to send the message that this company is really innovative”. Autodesk also invites interns to its technology centers to work on for example how they are branding themselves as a company (L_4). Furthermore, there are the possibilities that the company uses UIC to get to know students and to decide if they would be a good hire or they are so impressed by the students’ work results that they hire the student to implement it. L_3, for example, said that “everybody gains a lot of things in this. We do it to gain access to talent, increase attractivity of a company. We want to be the popular company”. In addition, S_3 presumed that the project companies “have tried to have students there for a whole year, see it as a kind of trial period before they hired them”. L_1 confirmed that assumption and said that “one of the people I hired was a master student and they did a master thesis based on a global launch project that my team did. I wanted to to be able to hire good people and one of them or one of these two master’s students actually I hired after”. U_1 also supported the assumption by stating that “companies can check like, okay, he or she is good and you’re like, I want to hear more. I want him or her to offer to come here for a summer job”. Moreover, SL_1 said that “during my bachelor we founded a company, which was basically, which was very trying try to link the students and workplace. This company was sort of an accounting company and we so we hired only students to do accounting for small and midsize firms. We struck up a partnership with Deloitte, so everybody got training at Deloitte as well. And then they could hire from us. So that was kind of the, the idea people could get quite cheap accounting, while the students got to practice their knowledge and also get like a foot in with Deloitte”.

For S_2 her collaboration project led to a full-time position because her company asked her to stay to continue with her project. So, this is also a possibility. Nevertheless, U_2 pointed out that “most of the coaching is saying, do not answer the client what the client is asking right away. Answer to what the problem is answering. Because they just want to please, they want to get a job afterwards. It makes sense. But this is not why they’re in this learning environment. Their job is to do the project now, not get a job later and they trust that, you know, but they are very kind of easy to get convinced that that’s why they’re doing these projects”. In other words, students should not try to say what the clients want to hear, but really identify the problem. This is more valuable in the end for the company and also for the student, because U_2 also said that “if they’re not so pleasing to everyone, if they like actually do the job, they have a much better chance of getting a job later. So, they actually do the project and surprise, you know, like don’t listen and go against them or do a good argument. Then there all of a sudden, they show their value”.

All in all, UIC provides value for industry, because companies get access to universities’

4. Analysis

knowledge and connections. Furthermore, the collaboration between industry and students provides industry with value because the companies get access to students' knowledge. New tools, approaches et cetera. Moreover, students also bring inspiration and energy to companies. Students' fresh perspective and ability to reflect is also another value companies can gain from collaborating. Students dare to question the status quo and make the companies rethink how things are done. It is helpful that students have a non-threatening position in the company and employees are more open to share what they think with students than with the manager directly. Furthermore, students do not have to be afraid, because they do not have anything to lose. Normal employees could get fired. In addition, students can help companies to prepare for the future by keeping up with the markets. The financial aspect also has to be considered and the data results show that companies profit from the students' work and it is cheaper than paying a consultant. Last but not least, UIC is also a possibility to brand the company and to attract talent. It is not only a chance to attract talent, but also to get to know the students and to decide if it is a good fit for the company.

4.2.4. Influencing factors of UIC

UIC is influenced by many different factors, but one of the most important ones is culture. IU_3, for example said that the business culture in California is very special, "there is a business culture out there and it is unlike everything else in the world. I think globally the connection, collaboration whatever between universities and industry is sub-optimal almost all of the time". He pointed out that Germany or Scandinavia are good with technology. Nevertheless, he said that "I've been always stunned with the lack of innovation coming out of Germany. So, because so many brilliant people, rated technology. But when you look at this tiny little area that we're both in right now the Bay area, there are 57 companies that are at the level of Apple, Adobe, Pixar, Google, Tesla, 57 of them. I think there's none in Boston. There might be one in New York. I don't think there's any in Berlin. Do you know what I mean? We have 57 and most other city have none. I think it's a cultural thing also". According to him, the Bay area has a very innovative culture, which explains why the density of innovative companies in the Bay area is that high. When he connected this to UIC, he said that they have "exceptional and unparalleled university and industry collaboration there, because of this sense of openness. Like I've often said, it's not even a culture of failure and a culture of risk. We don't just, we just don't care about those things very much. We don't try to fail. We don't try to take risks. We just don't care that much" (IU_3). In other words, UIC thrives in the Bay area because anything seems possible and failure is accepted. Furthermore, UIC at Stanford University and UC Berkeley works differently, because the students come in contact with startups and big tech companies more naturally. According to IU_3, "Stanford and Berkeley are different in the following way. It's not like you go to Berkeley and all these companies out there do internships. I'll say that it's not about internships. That's not what it feels like. It feels more like you go to Stanford and while you're roommate is gonna do a startup and his brother is already running a startup and if you want an internship or something, fine, we'll just make a call. There is one way that is the same.

4. Analysis

The recruiters that come to us. The recruiters come to Berkeley and Stanford just like they would anywhere else”. Nevertheless, according to IU_3, “the reason the collaboration between universities and industry is so good here. I think it’s not only the universities or industry. It’s the whole culture. In my work I’ve talked about this a lot. The idea that there’s this very much of a yes before no culture here. The attitude is anything’s possible. And that’s not just like inspirational. That’s literally true. The range of things that are possible, it goes beyond our imagination. So, I think now that I think of it. Universities here, industry or business are all in the context of this very unique culture, where whatever your ideas are, it’s almost like a seed, right? You drop a seed into bad soil that is not going to grow. You drop a seed here and the soil is so fertile that the worst thing that happens is you’ll have a wild ride even if it fails”.

On the other hand, U_3 mentioned that with UIC, “there’s a bit of a meeting of two cultures. So, for example, the university culture is very open. Our goal is to disseminate information, sharing information, publish, we are all about protecting academic freedom, while the company culture is more about, it’s more closed typically. So, there’s a lot of proprietary information that they need to keep confidential. It depends on the company. But I would say, you know, universities tend to be more open, and about kind of free dissemination of ideas and the companies tend to be a little bit more kind of closed and proprietary. So, the challenge is when you have those two positions meeting in a contract, as you can imagine, it’d be quite difficult to negotiate”. This might be the reason why UIC works so well in the Bay Area, because businesses are very open to work with students. It seems like the universities in the Bay Area are very well connected to the companies there and the companies are open to take in students that have ideas and to work on it together. IU_3 confirmed that and said that “the difference between the startup ecosystem and Stanford, it almost seems like the same thing. So, the other thing I would say is that the research done at Stanford and Berkeley, in my opinion, is both super-cutting edge ivory tower but everyone also keeps an eye out on the world. So that’s partly why it’s not, as we say, ivory tower. You know, it’s you can’t go to Stanford and escape the real-world”.

Based on the data collected in the USA, culture seems to have a strong influence on UIC. In Sweden, the interviewees mentioned leadership as an important factor. According to IU_1, “leadership is really kind of the first important step for having students or in general researchers” in the company. SL_2 agreed with that and said that “you need somebody who’s like really driving it somehow. So, like if I would go to my manager, I don’t think he’s that much interested in it at all. And so, I think it will be different, more difficult for me to sell it”. L_3 confirmed that and said that he as a manager pushed it in his company “everybody was like, Oh no, we never have done it before. I said, I want to do this. And of course I’m in a position in the company that I can force people to do things”. So, in this case the manager pushed UIC although employees were resistant in the beginning. IU_1 pointed out that “if the leadership is interested in research that also students or researchers can do. Then they would always find the money to do it and if they’re not they won’t do it”. In other words, leadership has to be interested in research to make UIC possible.

In addition, leadership also seems to be very important for the area on what students are

4. Analysis

allowed to work on and how much decision freedom they have. It depends on the company if students have the freedom to propose new ideas or if they should develop already existing ideas (U_1). S_3 said that the scope for her project was given, but “otherwise they just said, do whatever you want as long as it’s good”. S_2 added that “it’s completely free what the innovation is depending on the company and industry. So, like we aim to do, not an incremental, but more like a radical innovation, but of course you have to act under the, some industries are more innovative. Some industries are pretty traditional. So, the things that you can do and the things that you can call innovative is different”. In other words, if students have the freedom, they develop a whole innovation project on their own, considering the company’s situation. S_1 agreed with that and pointed out that “it depends on the company you’re at and what level of politics that is relevant for that company. So, for some companies you’re quite free and they trust you as a student quite a lot. While other companies are more restrictive and more, they’re more telling you what to do rather than letting you think on your own. So, it differs quite a lot”. In SL_2’s experience it also depended on the company and “the companies would come in either with predefined challenges or questions or they came in just like completely open slate”.

Furthermore, management has to be open to new ideas, no prestige thinking and thinking that they are smarter because L_3 said that “if the organization is not open for that type of a, I don’t know what you call it, but if you, if you’re not really, I could be offended by you. People come telling me how to run business. Do you know who I am? You know how much money I make? If I had that point of view instead of being really interested. Okay, how do you think, ah, I never thought of it that way. The person that you meet has to be open to it and not to be closed and have a lot of prestige and thinking they are smarter and better”. So, it is about giving the students the freedom to bring in ideas and also to take it seriously when they bring something up to the manager. L_1 had the same opinion and said that “when I’ve been working with students I say, okay, if you have this problem, what would you, what are the two or three different options that you think are the rights ones and why do you think these are good and which one is your favorite? And then we discuss that and maybe come up with a fourth one or maybe we develop one of them I came up with. Because if you always tell people I got this problem and I don’t know what to do, I can always come up with a solution, but it might not be the best one. You make the people passive as well. I want people to be very active. You tell me what you think and then we can discuss if that is the right way or if there is another solution that we can develop out of something or could be completely different”. So, it is important to take the students’ ideas seriously and to discuss them, otherwise students become passive. Therefore, it is also beneficial if the lecturer makes sure to partner with companies that are open to students’ ideas and suggestions. U_2 for example said “I approach people that are willing to work with my students. So, by the time they get to the students they’re willing, cause they’ve kind of already gone through a rigorous selection”.

Another influencing factor of UIC is company size. First of all, bigger companies have more resources to work with students. IU_1, for example said that “the bigger the company, the easier it is to find the money to work with the students and find the time”. On the other hand,

4. Analysis

smaller companies need students' work and insights more and rely on it more because they have less resources than larger companies. IU_1 pointed out that "the smaller companies, I think they're also interesting because they would use the students' research and all the insights even more, because they would see this as an important project, because they won't have researchers themselves and I don't know if they would pay students or not. That's a different question, but I think the smaller companies would value a student work differently than a medium sized or bigger company, because they would rely on it more. They might even sell the insights or outcomes who knows but of course hopefully have the students be a part of selling the insights as well". Furthermore, smaller companies might not only be open to implementing the students' ideas but might also co-implement with the students and they can observe the outcome. In U_2's experience "the smaller companies are like, they not only are open to implementing them, they probably are implementing them while the students are with them. Like they're probably co-implementing things. Right. And I find that really exciting".

U_1 agreed that small companies might be more driven to implement the solution quickly, because if you have a "small organization, there's normally one or a few people working there and then if they bring up a problem, it's really a problem for them. That's actual, that's important. That's just like, you know, we have to fix it. So then of course they have, a student group comes to this kind of advice, you know, there's a lot higher likelihood that they will do something about it. Whereas if you have a larger kind of company, they said, well, yeah, there's so many different things. I mean they can still do the project, but it might end up in a nice drawer or somewhere, because normally when we work with smaller kind of companies, it is a problem that they are attached to for themselves personally that makes it also slightly different. Small kind of organizations have an advantage when it comes to, let's say development thinking". Furthermore, large companies have a fixed way of working, which limits their chance to become innovative compared to smaller companies. U_1 said that "the possibility for small to medium sized companies to really get innovative thinking is slightly higher than for larger firms. Because, I mean, if you think for example about Volvo or SKF, you know, they have their routines to follow their process to follow. That might sometimes stifle a little bit like what you can do. Whereas in small medium size, so small enterprises like you just have a look. It's just more of this kind of openness".

S_3 made the experience that larger companies are not driven to implement new discoveries. When she did her innovation project at Volvo, what they did was "leave a prototype and a business case that we had built and also like recommendations for further work. None of us continued to work there. So, we basically tried to leave all the opportunities that we had seen so they could pick up on them and try to do something good with them. I've had contact with people at Volvo cars after we finished, one and a half years after, and they know about the project still. It was a completely different department, completely different person and they knew about the project still and had it in the back of their heads, but nothing else has happened with it" (S.3). So their project apparently left an impact, but no one had an incentive to implement it, although it seemed to have value creation potential. Nevertheless, S_3 argued that "in general

4. Analysis

you could have this real-life experience no matter what company you're in because every time it is real, so I think if you were to like shape a program, it doesn't really matter. I think people should be able to choose for themselves. For us [worked in a large company] it made a difference sometimes because we had communications with people in many parts of the world and trying to get information from people in Asia for example, was a challenge sometimes. And we discussed with people in LA and they had certain ways of expressing information and you know, these kinds of cultural clashes that you can only get into in an international company. But I think either in a large or in a small company you will learn other things that are also very valuable". In other words, no matter if the project results are implemented or not, the most important value for students are the real-life experience and learnings.

Another aspect of company size might be that it seems to be easier to work out a collaboration with a smaller company because they require less administrative and legal considerations. U_1 said that "sometimes the larger the company it can be actually be a negative effect because I mean yeah we have NDAs and stuff whereas smaller or medium sized companies are just like, yeah, I just want to group with students so that there's a slight, there's a slight difference as well". In the USA it seems to be the same case, at least for public universities, because U_3 said that smaller companies "are willing to kind of accept our templates and they're pretty easy going about contract languages and a lot of negotiation because they just simply don't have the means to, to challenge it and we're not in a position as a public university to try to get a good deal in an underhanded way. Basically, we are trying to just ensure that we follow university guidelines, not the negotiation in the sense that we're trying to get the best deal possible. It's, it's more that we need to make sure that we're paid for our time and our efforts, the cost of our research".

Moreover, proximity of industry and university has also an effect on UIC. Proximity is important for establishing UIC and makes it more likely. SL_1 for example pointed out that "it is more likely that the Swedish students from Gothenburg would collaborate with Volvo than they would with Scania because of proximity. So, I think, I think that's also key. So, once you take that into consideration, then it's likely that companies that are also based and headquartered around cities with prevailing universities are more likely I would say to, to collaborate with students and universities". Same applies at UCI Beall Applied Innovation. Some students do an internship at the nearby UCI research park, which would be difficult otherwise from a time perspective. S_5 said that she has a friend "he's a PhD in electromagnetics and he is working part time or something at Skyworks, which is at the research park, which is the same area where the applied innovation is. It's convenient because he can basically bike there and back to campus. Whereas if his internship was a different city, you couldn't have done that". Furthermore, UCI Beall Applied innovation rents out small spaces to startups or companies at "the cove" to gather innovative thinkers to have interactions and to build an ecosystem. U_4 explained that "we've provided physical locations to gather all the innovative thinkers in the startup world. We have a venture firms' representative, you know, like we tried to build those connections for companies to be in the same location so that they can have those interactions. That's the whole purpose of

4. Analysis

having like offices for smaller companies or like start up companies within that space”. In other words, the idea is that co-location encourages people to interact and to connect.

All in all, there are several factors influencing the creation and course of UIC. One of the influencing factors is culture. The Bay area for example is known for their open and “yes before no” culture, which has a positive influence on UIC there. Furthermore, leadership also influences UIC. It is essential to have an interested manager that drives UIC and makes it possible. In addition, leadership is also important for how free the students are with their choice of project topic area and if the management is interested in their ideas. Moreover, company size does also influence UIC. In general, smaller companies seem more interested in implementing results, whereas larger companies have more resources to collaborate, but the results might not be that important to them or too complex to implement given existing processes. Proximity seems to have an enabling effect on UIC due to convenience. Furthermore, co-location encourages people to interact and to connect.

4.2.4.1. Influence of a facilitator - First to Know

Initiating UIC and finding the right person in the beginning can be a challenge for both sides, university, and industry representatives. For U_1 the creation of UIC so far has been more about “one-on-one relationships”. Furthermore, there seem to be two barriers to the creation of UIC. First, companies do not seem to sufficiently know or understand what lecturers actually do (U_1). So, U_1 as a course lecturer had to do some kind of education. What can the students do? How can they contribute? Nevertheless, for him the initial work seems to have paid off, because it became easier and easier to convince them and now companies are getting back to him as well (U_1). However, it took U_1 quite some time to develop his own network in Gothenburg, to get to know people from different companies before he was able to initiate UIC. In addition, even if there is interest on company side to collaborate, approachability of universities and finding the right person is still difficult (U_1). IU_1, for example, said that her company also works through personal contacts to find students to collaborate with. Furthermore, also I_3 mentioned that he started to collaborate with students after meeting university professors at networking events. Moreover, U_1 also said that “academically it has been a little bit more of a challenge just to get it accepted in a way”. So according to U_1, personal relationships initiate UIC and keep it going and then the involved parties realize that there is a “win, win, win situation in these kind of collaborations”. Therefore, a mediator or facilitator is very valuable to turn these collaborations more into “structural kind of relationships” (U_1).

According to U_3, personal relationships are also very important in the USA to initiate UIC. It is for example very common for former students that went to work in the industry to connect their previous professor with their company. Furthermore, the Innovation advisor network, which is part of UCI Beall Applied Innovation, is also mostly driven by individuals, it is not driven by companies (IU_2). According to him, “there are people that work for large companies that have joined, but I don’t know if their companies are really sponsoring them or they’re not discouraging them, but I’m not sure any of the companies are encouraging” (ibid.). Moreover,

4. Analysis

the Innovation advisor network “grows by word of mouth” (IU_2). In other words, also through personal contacts and networks.

Initiating and finding the right person in the beginning is a challenge for both sides, university and industry. Therefore, a facilitator or mediator could be key to overcome these initial barriers. Therefore, as part of this research project, the company First to Know was looked at in more depth. It is a company, which tries to connect university, industry, and public organizations through collaborative projects, as introduced before. Part of this research project was to look at what First to Know does in general, what they do well and what they could improve. First of all, several interviewees praised the good purpose of First to Know. SL_1 for example said that First to Know has a “good purpose and brings value to the students and to the companies” and SL_2 agreed with that by mentioning the “really good set up that they are working with [...] they are doing a great thing”. In addition, IU_1 revealed that “this interest in working with students” that they “really value that” made it easier for her as a course leader to assign a student group to the projects they organized. Nevertheless, there was also a strong feedback to find a focus and to communicate the offer and the value it provides more clearly. For example, U_1 said that from a university perspective it would be good to know how “these kinds of collaborations could potentially work”. U_2 agreed with that because if the project is part of the curriculum she has to make sure to be “hitting particular learning goals, [she] need[s] to be a little more in control of which company and maybe need to have [her] own [partners]” because for her “hitting the learning goals for the student, which, so on [her] side as a teacher, that’s more important than delivering what the company says in the beginning”. In addition, it is important for First to Know to find a focus (U_1). “What is First to Know really about? So, if I have, for example, a societal challenge, I can talk to First to Know” (ibid.). So far, First to Know focuses “on different kinds of things and different kinds of topics” (ibid.). That is also good, but it could be beneficial to be more thematic and to define what they mean by these topics because topics like for example “societal innovation could include a lot, depends on how you want to put it” (ibid.). So it could be profitable to find a focus and then in addition to that, promote and brand themselves more (L_2).

Moreover, L_3, for example, said that when First to Know proposed the first project to him, he did not really understand what they meant. For him, it was a gamble to invest in the project and it paid off, but if First to Know became more specific about what they do, maybe they could win more clients. IU_1 also pointed out that it is important to be “very specific with what they are and what they’re offering”. They should be clear about what students and what the companies get out of it (ibid.). U_2’s thoughts went in the same direction. For her, their business model is unclear, “like how did they put bread and butter on their tables?”. She mentioned her assumptions that the clients pay them to find students, but then for her the question is about the potential “exploitation of students who are not being paid, so there is this like moment of who is benefiting what in these relationships” (U_2). IU_1 had similar concerns because she said that “in hindsight it looks like they got a lot out of it, the students of course they had their projects, it was important for them, but it was mostly First to Know that got most out of it.

4. Analysis

And that is not how it is supposed to be probably”. Nevertheless, U_2 is willing to collaborate, if they have a project that fits the need of the course and there are not enough other interested or suitable companies in her own network, but she also kind of competes with First to Know, because she considers going out and finding clients for her student projects as part of her job (ibid.). But she also admitted that there are moments when it could be useful to have First to Know, because course leaders also have other responsibilities and do not always have the capacity to look for partner companies themselves (ibid.). Therefore, as mentioned before, it is important to be clear about what they are, what they offer and what the benefits are for the parties involved to become a valuable partner for UIC.

Furthermore, there could be an opportunity to show clients that First to Know can provide more than the course leader can achieve by himself. U_1, for example, said that he has his own network, which he can use to build alliances. For him, the question was then what First to know could “offer more or differently” (U_1). His conclusion was that First to Know’s mediating role is very beneficial. U_1 said “especially when it comes to let’s say, companies that are maybe not so used to kind of like working with university students. It’s good to have these mediators that you have a few people at First to Know that have a kind of like understanding of let’s say the academic situation, what is required. At the same time, they can come and transfer that to let’s say to companies as well as the other way around. It’s like what does the company want? So, it’s sometimes it funnels a little bit so. So that’s good.”. In any case, it is essential not to promise more than what actually can be offered because that is apparently something that has happened a lot in the beginning of past projects and that is “kind of a false attraction to students” (IU_1). “Hey, you can talk to this, this and this company and then it is only two for example you actually talk to” (ibid.). IU_1 rather suggested to be fair and “be honest about the connections you can actually provide because sometimes two might be enough” (ibid.). If these concerns can be addressed, First to Know actually provides value, because IU_1 disagreed with U_2 and said that she appreciated being approached by First to Know. First to Know was always looking for students doing different kinds of projects and for her it was really good that she did not have to look for projects herself when she was a course leader. In addition, SL_2 also claimed that “what I think First to Know also wants to do [is to] facilitate and make it easier for this connection [connection between university, students and industry] to happen because it’s only beneficial for all I think and so this middleman or facilitator is always needed”.

SL_2 also suggested that it could be beneficial for First to Know not to be a profit driven organization. This could help to get more companies interested because in the past it has been difficult for companies to find or to justify the budget according to him. Especially, when the focus or benefits of the project are not clear in the beginning, which is typical for projects with First to Know as mentioned before (SL_2, U_1, U_2). Nevertheless, from the university perspective this is also difficult and not just regarding budget, because U_1 mentioned that “these two gentlemen [from First to Know] are highly entrepreneurial and that is not always what universities are or can be, picking up a new idea, just kind of go with that. Universities as a public organization have certain rules to follow, this is what we can do, and this is what we

cannot” (U_1).

Another aspect of what First to Know does well is that they can facilitate interdisciplinary collaborations because they have connections to the business school and the technical university. For example, SL_2 claimed that “being able to create some kind of cross functional teams which would go into companies that always requires something like First to Know. So like for me, let’s say that I wanted that and I didn’t know First to Know, it would be very difficult for me to go to the university and say, I’m looking for a team of cross-functional students that can come in and work on a project basically tomorrow. But maybe First to Know has done that already and have quality students working with them”. U_1 agrees that interdisciplinary collaboration is “something very difficult for us to achieve in our educational settings”, especially in courses it is difficult to go beyond. Nevertheless, innovative thinking requires interdisciplinary teams and it is important to have people with different kinds of backgrounds (U_1). This is an area where First to Know could come in and create value. So, First to Know plays an important part in that. L_3 said he could go to First to Know and say “I have this idea of a more sustainable way to solve one issue that we have and they would say that would be a perfect case for a couple of students. We would need one with an architectural perspective, a business perspective, and a human behavioral perspective. And he could find students that work on that case for me”. U_2 also sees interdisciplinary working as a big strength of First to Know and something she could not do on her own. So, interdisciplinary collaboration is an important field and that requires some sort of mediator or facilitator and First to Know could add substantial value in this area and provide a unique service.

All in all, if First to Know is able to implement the aforementioned improvement suggestions they could become an even more successful and better-known partner in the area of UIC. Overall, the interviewees appreciated First to Know’s work and claimed that they have a great network and they not only connect university and industry, but also brings in public organizations (L_1, L_2). Furthermore, enabling interdisciplinary collaboration seems to be very valuable for university and industry and First to Know can use that to develop their offering further and establish themselves as a valuable and unique partner for university, students, and industry.

4.3. Effects of UIC on innovative thinking of students

In this chapter, the collected data about the effects of UIC on innovative thinking will be explored in greater depth.

One controversially discussed aspect during the interviews was the question if it can be learned how to be innovative. L_1, for example, argued that innovative thinking is a mindset, which you have or do not have. He said “it’s something you have, you bring it with you. When I hire people, I usually hire them when I say hello, in my mind I hire them. I come up and say hello and I look in the person’s eye and I know whether I’m going to hire that person or not. Because it’s something in there that you see already when you meet somebody. If this person has potential or not. I cannot put the finger on exactly what it is, but there is something in that person’s mind or

4. Analysis

mindset” (L1). IU_3 agreed with him and stated that “I’ve been an innovation nerd for 25, but I am at the point where, I mean, I still have a great hope for innovation around the world, but to some degree I’m stymied. Like I, for my own work, I have arrived at the point where I know that the differentiator, if you just think about innovation, is this mindset”. Nevertheless, some interviewees argued that the educational systems or universities need to reflect on what they need to provide to students to nurture innovative thinking. U_1 said that “it’s kind of like part of let’s say, I think you know how innovative thinking it’s also connected to this kind of courses, not only in terms of the project itself, but also what educational systems, universities need to provide more specifically to students as well”. Furthermore, S_3 explained that “If you can teach entrepreneurship, some people say you can, and some people say you can’t. I think for me due to my master program I kind of have to say that I think that we can learn entrepreneurship just like everything else. We’re practicing something and we’re getting better. I think the courses in the first year prepared us, partly with knowledge, but also with the fact that we were kind of set in situations where we had to cooperate with people who had completely different backgrounds”. S_2 did the same master program and agreed with S_3 that they had “a lot of classes about like team values as well, how to work in a team, team values which is like one of those most important things in the entrepreneurial startups as well”.

By contrast, S_1, another graduate from the program, claimed that students would have needed creative thinking courses to be more innovative during the projects, because doing something unusual does not mean that it is innovative. He explained that “one thing that I lacked throughout the master’s program was to actually focus on how to be creative. So, in order for you to be innovative, you need to have creative ideas. And then the second part of that is having the possibility to actually implement them. I felt that we weren’t really trained in being creative, I didn’t know that at the time. But since I started working as an innovation consultant, I’ve gotten a better sense of what being innovative actually means. And looking back at the program, I do like some kind of introduction to creative thinking. So, it was more, for me, about carrying out for the company an unusual project. So, I think that no matter the idea that you would have pursued the whole idea or the whole reason for doing it was to do something that the company wasn’t used to doing. So, it became more about, okay, how do you navigate the corporation in order to succeed with projects that is unusual to the organization. So, it’s not necessarily about, you know, radical projects more just projects that they are not used to be pursuing” (S_1).

However, S_4 also graduated from this master program and he said in hindsight, working as a consultant in the area of innovation, that their master program developed students’ innovative thinking, because they got all the tools in the first year and could apply it for the project in the 2nd year. He explained that “we had these different tools that we had learned in the first year, kind of like minimum viable product, business model canvas, these different ideas around innovation management and also very much in this start phase and since the first year of our masters had this perspective of intellectual property, a lot of things had to do with a competitive advantage. So, meaning that when we pursued our ideas we could actually make a difference

4. Analysis

and how Volvo Penta in my case, then protect this idea from others. So, I think we have that perspective when we came in, but we were definitely given the tools perfectly from the first year, also like how the second year is structured, I mean you have Monday to Thursday to spend at the company. So, you will have a lot of time. You have a lot of tools and structure around how to really create something. We also really wanted to kind of be concrete in what could be done and not just, you know, in this a lot of times there's a lot of buzzwords and a lot of words around future and so on. But we wanted to really make something that could really help them going forward. Something they can really, really use". So, in other words, courses about innovation, entrepreneurship and group work with people with different backgrounds help to learn about innovation and entrepreneurship and are a good preparation for the real-world.

Although courses and learning about tools are important, S_3 pointed out that they developed their innovative thinking also because "basically we didn't get any let's say frameworks from Volvo cars. We had a supervisor who tried to give us some feedback and tried to help us and he really wanted to help us in a good way, which was, which was awesome. But I think for us it was very much about thinking for ourselves and seeing what happened when we did certain things and that was a good way of learning". So, not only tools should be learned for developing innovative thinking, but it is also important that students start to think on their own and using a trial and error approach to learn. In addition, S_3 said that they "got to practice and in the sense that you're always getting better at what you're practicing, I think it was very, very good opportunity to do that. I think I learned a lot more and became more innovative if that is something you can become, because we actually did things in practice rather than just reading about it and writing about it". In the end, S_3 developed an idea that was not "really radical in comparison to the world in general, but it was really radical for Volvo cars". So, another aspect of developing innovative thinking is practicing it.

So far, it appears like developing innovative thinking is a learning process. Innovation is hard work, it is about thinking outside the box, to challenge things and also about making choices and how to deal with failure. U_1 teaches innovation courses that include projects with industry and he said that "it's a learning experience. They say innovation is 10 percent inspiration and 90 percent hard work. I think that's very, very true. It's not always kinda like these light bulb moments, you know, innovative thinking, of course, you think outside of the box, challenge what you do, go out don't stay in the harbor, but go out and sail the oceans. But it's also about making choices and sometimes you're right, sometimes you're not". In addition, SI_1 pointed out that "I think students are, I think most people are innovative. It's just that you have to dare to be innovative, it takes just the right personalities maybe. Some people are probably not even going to be innovative even if they get the opportunity to collaborate with companies. I don't know if it is a prerequisite. I think it's more of an opportunity to explore that side of yourself". So, most students are innovative, but they have to dare to be innovative, which might be connected to a student's personality. UIC gives an opportunity to explore that side of oneself.

Regarding personality, it was pointed out that innovation students are likely already interested in innovation from the start and build their innovative thinking further through the program,

4. Analysis

because they get tools and have discussions with people working with innovation. S_4 said that “I don’t think the usual student in my class or in any class that has this entrepreneurship or innovation thinking, is you know, stiff and doesn’t like new businesses and new ideas and new products. I think the average student really likes that and has that interest and is curious about these new things. Otherwise you choose something else. But I think what the program gives you are the tools in the first year and then you were given an ecosystem of people that you can ask for any questions you have or discussions around anything. So, you’re given this environment with the tools and with the company and with the innovation effort that you really put in, you’re really able to create something. And I think that’s something that really is kind of significant or very typical, I would say, to students from this type of program that you really like to create something that you really like to see something that you have put in your innovative thinking, your creativity into that same environment”. So, students develop innovative thinking during master programs, but these programs might attract more innovative people from the start. U_2 agreed with that and said that “I think the students that apply to this program, want to be drivers of this very creative thing and are like maybe already close when they come in. So, I think they just get better”. So, in other words, students might already be innovative thinkers when they start the program, but the program still helps to develop their innovative thinking further.

Moreover, several interviews showed that students develop their innovative thinking, while collaborating with companies, when they have the practical context. SI_2 said that “more of the innovation came when we were actually trying to just brainstorm on a problem or challenge”. In addition, students have an idea what innovative thinking is, but when working with companies they develop it further and refine it. In L_2’s experience “they have a picture of innovative thinking when they enter the company and maybe it’s being refined after a while, working together with companies regarding specific ideas and projects. I think you have a picture of what innovating thinking is and then, and also what it takes to go the whole way from idea to product or services or whatever you are going to innovate”. SI_1 agreed with that assessment and said that “it always takes a while to get in, understand things for sure until I understand how procedures and processes work, but so yeah, that’s a clear yes” to the question if the students’ ideas improved over time, so if the students’ way of thinking improved. Nevertheless, it also depends on how supportive the company is and how the project is set up for students to develop innovative thinking. SI_2 pointed out that “if the company is more open to bring in the people and like help them to grow in that, in that sense, I think that definitely helps with becoming more innovative. Because if you’re doing a project and the only difference is that you’re getting a project from a company than from your teacher than it doesn’t really change your way of thinking”. IU_1 agreed with that and said that it depends on how the students work. “Sometimes it happened that students actually worked together on a real project and then I think there is a greater probability that they are building this innovative thinking, but sometimes the project is also set up more like a series of interviews and then I don’t know if it really impacts their thinking. I always tried to get the students to follow my project and even

4. Analysis

you know, maybe work on developing some workshops or whatever, because then it would be a part of the project and then definitely their innovative thinking and thinking in general would be impacted a lot. Because they would learn a lot, they would be there in a real project. There would be layers of knowledge. But if they're only doing interviews and theory, I don't think that it impacts their innovative thinking. Maybe theoretically but not if they never work practically except for the interviews". In other words, students need real-life projects in which they are really involved to build their innovative thinking, only conducting interviews is not enough. In addition, an innovative mindset can be developed, but the manager's support is crucial for it. According to L1 it is "a lot about about your manager".

In addition, students learn a lot about innovation, when applying the learned theory in practical settings and compare the gained practical insights to what theory says, which accelerates learning and development. S_1 pointed out that "we do have a lot of courses in entrepreneurship. I mean that is all about having, having an idea or like spotting an opportunity in the market and pursuing that successfully. But we would need to transform that knowledge into the corporate setting, I guess. And that is what we're supposed to do during the second year. We do get an instruction on how to run project management, introduction to corporate politics and I think that these things are difficult to understand just by looking at the theory. It is something that I do think that you need to experience more to learn and that it takes quite a long time and getting the opportunity do it for a year with a company that is more or less inclined towards letting you run an innovative project is I think accelerating that development even if you don't come very far with your project. So, in comparison to learning what we learned in another setting I think it accelerates your learnings". S_2 agreed that innovative thinking can be learned when theory and practice are combined. She said that in the beginning "I didn't think that entrepreneurship is something that you can learn to be honest. I was mostly like, if you're an entrepreneur, you're an entrepreneur kind of. But I'm really glad because I think I really learned a lot. Like I can say that even though I might not know what I might need to do, I know how to look for the knowledge that I need. And also like in the classes that we have been put, we work with a lot of like a real researchers so it was really connected to the real-life. We have been in a lot of also real-life projects and I, I definitely think that I improved my thinking". Furthermore, S_1 added that he had the feeling that the master program was about "giving us some practical experience and then afterwards letting us compare that to theory and see what the differences are. More than okay, here's your theoretical ground and I'll go apply it in the corporate setting. So, it's almost like starting from zero and then you make the comparison later on. And I mean that's what we do with the thesis, that's where we combine our insights and compare them what theory says".

Moreover, when involved in real-life innovation projects, students get to know other entrepreneurs and the exchange with these people also shapes their innovative thinking. When S_2 did her master program she was able to build a network and now she said "all my network in Sweden is kind of an entrepreneur doing something, which is definitely effecting the way you think as well. Like you start thinking, Oh, that's the, so that is how can I, you know, how can

4. Analysis

I do something good too? So, it's kind of a nice push to each other as well. You get to know a lot of different people internally, externally by working in the company. But also, by working for school projects and stuff".

Furthermore, even if students are innovative from the start and come in with very good ideas or just need a little bit of nurturing, the collaboration with a company teaches them how to make the next steps, how to make an idea happen. L4 for example made the experience that "the folks that we've brought on in these internship programs are pretty innovative at the start from what I've heard. They came in with some pretty good ideas or it only took a bit of nurturing to get them to have some really great ideas. I think what the value is, you know, doing that within Autodesk is the structure, right? So, you know, if you have a great idea that's great, but how is that going to serve the greater business? You know, how is that going to contribute to our goals? How do you present this in a way that folks in upper management will take interest in it. So, it's all those sort of skills that are pervasive in a large company that are necessary for making your idea happen. These partnerships and these internships will probably teach students that way of thinking, beyond the, the just blue sky thinking, that they get right when they're at the end of their university experience". It is important for students to have a real-life project because it is difficult for university to simulate the real-world. There are many factors, which influence an innovation project that you do not learn about in school. S_1 agreed with L4 and said that before he started his one-year innovation project he thought that "the more radical project that you can run, the better. So, I started off with having quite high expectations and high ambitions as a student. Then throughout the projects for me it became a lot about finding the balance between doing something that was radically enough to actually be innovative at all and doing something that was enough in line with the company's strategy or like their core capabilities. The learning was quite valuable in terms of how to pivot your project and how to adapt to the changes and how to adapt to, like the realization that people say one thing, but sometimes they mean something else, which is, how it is I guess in large organizations. I do think that it's quite inevitable and having spoken to a lot of my classmates". In other words, real-life experience teaches students to find a compromise between finding something that is innovative but also something that the company is able to implement.

Moreover, S_4 also made the experience during his one-year innovation project that it is important to get to know the real-world conditions, which cannot be simulated at university, as mentioned before. S_4 said that "entrepreneurship or innovation, I don't think that you can really simulate it, to some degree yeah. Have a project in school, but if you're not really out there talking to customers, to suppliers to dealers to employees. I mean everyone that is part of the stakeholder mapping, I don't think you can really create something that has enough value for someone to really invest. I mean you can create something that is innovative, but I think if you, if you don't really have the ecosystem of people to really discuss this with, it's very difficult to really learn what it takes to create something new because we realized that that was really, really hard once we got to know all the people and where like the as is state, I mean really looking into, okay, what, where is this company in terms of innovation? Where's this

4. Analysis

company in terms of digitalization?”. U_1 agreed with him and explained that it is important to “collaborate and just maybe not have well framed kind of questions. If you start working, you will not have a well framed question. So, we need to do this. We don’t have a clue how to do it, what we need to do. You go and figure it out and then it’s up to you. So, it means that you have to see what is the context, is that the full context? Do I need to drive bigger? Do I need to make it smaller? Come and get different kind of perspective. You need to liaise, you need to talk, you need to do self-reflecting. Those are important parts of innovative thinking. When you want to think innovative, you have to question things”. Students have to experience how it is to run an innovation project, you cannot really prepare students. S_1 said that “you can’t really prepare students for the kind of experience that you’re going to gain from trying to run an innovative project in organizations”. S_4, for example, made the experience that his initial idea was too radical for the company. They had this idea, but when they had their interviews they realized that it was “too radical for the company to even adopt any of it. So, we kinda narrowed down our scope to something less radical” (S_4). So, it is important for students to get to know the real-world conditions to develop their innovative thinking.

S_3 agreed that the real-life context is necessary to create a valuable project and added that “it was real. It was problems that were implemented and projects that affected people out in their daily lives. I wouldn’t have done those projects with the same emotional impact, the same feeling of uncertainty, the same, political problems, everything that got real for us because the projects were so real. So, I think it was crucial to have those real projects. And we were also selling the project, so no one gave us the projects. So, we got that experience as well”. In other words, for students it is crucial to have real-life projects, because projects actually have an impact, which engages students even more. In addition, the students feel the uncertainty, they get to know the political challenges and they learn how to promote and sell their project. U_1 agreed with that and said “when it comes to education as like innovative thinking, sometimes you need to be pushed out and hopefully students can reflect back on that. So like, yeah, I was pushed out. I was uncomfortable, but you know, innovations are not comfortable. So, sometimes you need to be in the seat, experience it for yourself”. So, it is good for students to be pushed out of their comfort zone, it is important for their innovative thinking development.

Furthermore, the data showed diverse views on the value created by internships versus working with students in forms of projects. Moreover, there were different opinions about the impact on students’ innovative thinking. IU_3 argued that internships are “okay, but they don’t really yield that much. I would say they yield a good deal for the student, but it’s really just helping them think, that doesn’t yield luck for the companies. I think it’s more theater or poetry. You know, it looks good and sounds good but doesn’t quite really lead up to anything”. He criticized that internships seem to be useful for students, but do not really lead to anything for companies except for positive branding. S_4 kind of agreed with that and stated that “I think an internship is, is good, but I think it’s maybe too structured to be able to create something completely new. I think when you have this project that we had, you, you have basically a year and you’re given the opportunity to create something for a year”. So, S_4 worked on an innovation project

4. Analysis

for Volvo Penta for a whole year and according to him that is needed to have the chance to be innovative compared to a classic internship. Nevertheless, it seems to depend on how the company sets the internships up. At Autodesk, for example “interns have more time to sort of suss out these bigger ideas because they don’t have to do like their day jobs. Right. They don’t to or will have to like hit their numbers and all those kinds of stuff” (I_4). Furthermore, some of the interns at Autodesk “worked on really cool projects ranging, I think we’ve taken that very seriously and two of the interns that I’ve met have converted over to full time employees and have continued some of their work they were doing as an intern” (I_4). Overall, it seems to be a terminology issue. If one considers an internship as very structured and the interns are given tasks, it does not seem that valuable for the company, because the student does not come up with something new and also does not develop his innovative thinking. Nevertheless, if the internship is more structured like a project and the students are free to work on what they discover it is valuable for the company and also for the students’ innovative thinking. So, all in all, it seems to be important for UIC to give the students the freedom and the time to create something new. Then the collaboration between industry and students can create value for the parties involved and students can develop their innovative thinking.

In addition, there is another form of UIC that has an effect on innovative thinking among students. The student start up. SL_1 for example founded a start up with classmates during his bachelor’s degree. The idea was “to link the students and workplace. This company was sort of an accounting company and we hired only students to do accounting for small and midsize firms. We struck up a partnership with Deloitte, so everybody got training at Deloitte as well. So, the idea was that people could get quite cheap accounting, while the students got to practice their knowledge” (SL_1). In hindsight, SL_1 said that “nobody had ever had their own company. So, that was a work in progress. But basically, we tried to put as much from our studies into it as possible, which I think was really, really beneficial. What you do is, it’s actually less important maybe. I mean, they can always try to come up with your business idea, but failure is not failure, but just that understanding and actually practically doing and starting a business or a corporation, it was I think that was very, very useful to have done”. In other words, it is not even about being successful as a student entrepreneur, but about gaining the experience of starting their own business, which is valuable.

At UCI Beall Applied Innovation they also have the attitude that even if students fail with their start up they learn a lot from it and can improve for next time. IU_2 said that “even if they fail, they’ve succeeded because they’ve learned something and most of them have a passion, a real interest in starting their own company and they can learn hopefully from it if they fail. I think they do. They learn something that will help them as they launch the next idea. Failure is actually very helpful to them as well although they all want success, but they learn. They can also learn from their failures”. U_4 agreed with that and said that “they’re so early stage it’s good that we are supporting them but then the majority of them, like they don’t become anything but they spin off and just the experience of going through the process is very educational for them”. Therefore, UCI Beall Applied Innovation founded the student start up

4. Analysis

found, because they saw a “need there. We are trying to teach entrepreneurship and innovation among our students’ population. Therefore, this is something that’s necessary for us to have in order to support those students to get their ideas started” (U_4). In addition, IU_2 explained that the innovation advisors at UCI Beall Applied Innovation can help young entrepreneurs to get a real-world perspective and what aspects they need to consider for commercializing their idea. IU_2 explained that “most of the things I get involved with are going to be start ups that have their idea, but they may need some whole technical assistance. Most of them need marketing business development. That’s usually where they’re lacking and most of it is also around mentoring the start ups to different degrees as they go through their development process” (IU_2). Furthermore, UCI Beall Applied Innovation offers other programs to teach students the different skills or knowledge that they need for their start up. So, S_5 for example “participated in iCorp, which basically is a marketing program where they, it’s like four or five weeks, and they teach you to go out there and do market research, interviews with prospective clients etc”. In addition, IU_2 said that the students working on their own start up are “special people. They think about doing a startup on the side while studying. So, they’re kind of special people. They have that drive and I think that that will serve them well in the long term. We give them the help so that when they get out of school they have learned enough, and the next startup will have a better chance of success because they’ve learned so much”. In other words, UCI Beall Applied Innovation teaches the students how to be an entrepreneur and the “guided founding” of a start up helps the students to develop their innovative thinking and they learn how to be a successful entrepreneur.

At UCI Beall Applied Innovation, they try to help students to develop an innovative and entrepreneurial mindset, which is not just about the hard skills, but it is also a soft skill learning process. U_4 said that “entrepreneurship not just helps you to become a business person per se. But then it also helped them with other things, like the students nowadays, they don’t have a lot of time, have that experience to go through like the soft skill learning process. So, in addition to learning how a business runs, they also learn how to communicate. So, in that regards, it’s not only valuable for their, you know, just experiences and learning about entrepreneurship, it’s also helping them with everything else. And in fact, we do have an internal innovation and entrepreneurship collaboration network within the various schools [all University of California campuses]. All of them have been really involved in like trying to get their students involved in entrepreneurship and innovation so that they are exposed to this and they learn from it. So, I think UCI is at the forefront to try to get their students to be more innovative and have that entrepreneurial mindset”.

In addition, the UCI Beall Applied Innovation programs aim to develop students that are already innovative, already have their own ideas or experiences and other students that want to start to learn about innovation and entrepreneurship. U_4 explained that “it’s a mix of both. Some of them have their own idea and others are just learning what innovation is. We have another center on campus that’s for any students who are interested in learning more about innovation and entrepreneurship to go to and we have like programming at the center that help

4. Analysis

them develop that entrepreneur mindset”. In other words, they offer courses and other programs at UCI Beall Applied Innovation to develop the innovative mindset of their students. So, one can assume that they think that innovative thinking can be developed when students are exposed to the process of building a start up. U_4 also said that “a lot of our students who go through the program at the end, they all have like positive things to say, actually 100 percent of them say that the program really helped them out, just to go through the process, the educational experience of having to go through this is very valuable. It’s invaluable. They learn so much from it”. Furthermore, IU_3 pointed out that some students already have an innovative mindset, and some develop it when they are in the appropriate environment. He said that “if you think of who gets into Stanford or Berkeley. They are from around here and they’ve grown up with this whole tech business world. Or they are the crazy person from Iowa. Like they’ve always contended a crazy person. And then they get here. Feel all relaxed and everyone’s like them. In California, you are just another guy in the room. Part of the reason they’re coming are that they like this idea of innovation and excitement and doing new things. But of course, I think also people get it. Once they get here as well. It’s hard not to get. It’s hard not to get swept up in the excitement about that I would say”. In other words, the innovative mindset can also be developed given the right circumstances and they seem to be favorable in California.

Furthermore, UCI offers fellowships at “the cove” for graduate students interested in the business world to help with the research translation group or to make connections for UCI with industry. According to U_4 the fellows “help with like the research translation group. They help like the licensing officers with patent searches or looking up on like different things. That’s the RTG fellows. And we also have like another program for the enterprise collaboration group. So, for this fellowship, I believe they’re trying to make connections for UCI for the various school on UCI with industries”. These fellowships allow the students to look at different ideas and get to know the process of turning ideas into reality. S_5 is a RTG fellow at “the cove” and she said that “I get to see some really intimate scientific and engineering emissions. You learn like, Oh wow, these people get it this way and how did he get to do this? You can’t steal the ideas. But for me it’s just opening your mind, it really does teach you one”. In other words, the exposure of students to innovative thinking also triggers the students’ innovative thinking.

Furthermore, UCI Beall Applied Innovation tries to create a nurturing ecosystem with the UCI research park where other accelerators or incubators are located, and can be out in touch with student start ups, which make it to the next level. U_4 explained that “we want to be in that ecosystem that nurtures entrepreneurship and the startup world. There is also like another accelerator or an incubator within the UCI research park and we do some collaborations with them. For example, some of our teams are in the Wayfinder program. This program is like a six-month cycle. So teams, they apply and they enter for six months and then they get evaluated on their status or their progress. Based on their topics it’s either we recommend them to stay within our program or like we can, if they’re ready then we can refer them out to other incubators within our ecosystem. Like the neighboring incubator here or close to us. So, we do have some teams that go out and spin off and enter another incubator after they are here”.

4. Analysis

Similar to that, Chalmers University in Gothenburg has a similar approach to promote student entrepreneurship. They have an innovation office to support student entrepreneurship among other things, because the “master students or PhD students, they are pretty involved in this entrepreneurial area I would say cause they are really working on innovative ideas” (S_2). Furthermore, if students have an idea they can apply to Chalmers innovation office “for basically free consulting about anything about the project and then at the Chalmers innovation office, they both provide you kind of a free consulting. They also help you to get initial funding” (S_2). In a next step, it is possible to apply to Chalmers ventures, which is “mainly an incubator. So, you are still actually working on verifying different ideas, for example market verification, and those kinds of things. There are a lot of courses in Chalmers itself where you can get help. For example, we had this idea acceleration course where we are matched with those ideas. So, for example, someone is saying that, Oh, I have this innovation and I, I don’t know which market I should go. Then we do the market analysis. You can get help like free, while the students are learning how to do that analysis. They are actually doing hands on with your project at the end you actually get something resolved and the students end up learning it” (S_2). In a next step, students can either develop their innovative thinking by working on their own idea further or by supporting a researcher to commercialize his idea. “You can either match up, for example, if you’re a researcher but you are not a business developer, so you don’t know how to develop the idea. So, you can then match up with someone in the second year master entrepreneurship technology creation track” (S_2). In other words, students can get involved in a researcher’s commercialization attempt and support him while learning more about being an entrepreneur and improving their skill set and innovative thinking.

Connecting these results from Section 4.2 and Section 4.3 back to the results of the pre-study analyzed in Section 4.1, it was confirmed that it is important for students to observe real business needs. Furthermore, it was confirmed that companies seem to be interested in students’ knowledge and that students’ fresh ideas and perspective can also motivate employees. How much freedom students are given by the manager to create and bring in ideas was also identified as an influencing factor. Furthermore, it was again mentioned that it depends on the students’ how much guidance they need and how independent they can work. Furthermore, the aggregated themes “Personal development due to working”, “Collaboration gives new perspective on theories learned at university” and “Influence of size of company on collaboration” from the pre-study came up during the interviews for the main research project. It was confirmed that “Collaboration gives new perspective on theories learned at university” has an influence on innovative thinking when students learn how to apply and test theory in practice. Moreover, the size of the company was often mentioned by the interviewees to have an influence on the collaboration and the development of innovative thinking.

To sum up, the data shows that it can be learned how to be innovative and to develop innovative thinking as a student. Several interviews pointed out that students develop their innovative thinking, while collaborating with companies. Especially, master programs aiming at educating students how to be an entrepreneur and which combine theory and practice seem to

4. Analysis

be effective in developing students' innovative thinking. This practical experience is important for students to refine their innovative thinking and to adjust it for real-world circumstances. Students learn which perspectives to consider and how to pitch an idea to management, so that it is actually further developed and implemented. It is important that the company is supportive and helps students to develop their innovative thinking. It depends on the company how much freedom they give to the students to experiment and try things out, which would be beneficial for the development of innovative thinking. Students seem to have a different way of looking at things and to reflect on them, which is an important part of innovative thinking, and they can use these insights to drive innovation while collaborating with companies and develop their innovative thinking further. Moreover, the process of learning about innovation is accelerated when students are able to apply and test the learned theory in practical settings. Students have to experience how it is to run an innovation project, one cannot really prepare them and simulate it in the classroom. It is important for developing students' innovative thinking to push them out of their comfort zone and let them develop a trial and error approach and to learn how to deal with failure. Students can either learn this by working on a project with a company or by building their own start up.

In the following, Figure 4.1 gives an overview of the steps of the analysis. The codes were summarized into themes, which can be found in the first column. The second column lists the aggregated themes, which mirror the structure of the analysis chapter. In the third column, one can find a short overview of the main analysis results.

4. Analysis

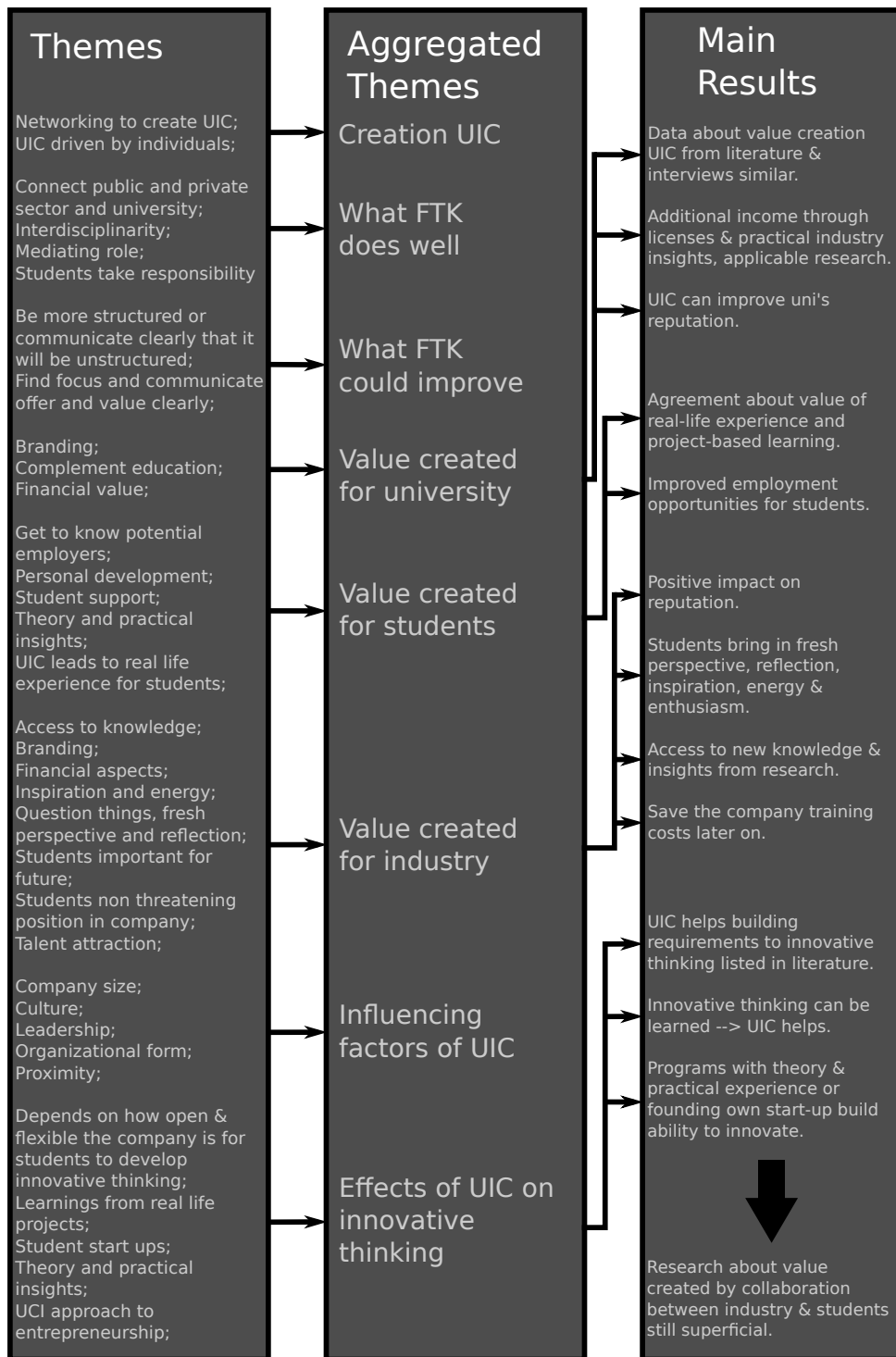


Figure 4.1.: Overview analysis.

5. Discussion

The discussion chapter is divided into two main parts. First, it will be discussed what value UIC creates according to literature and interview data to answer the first research question. Then in a second step, the literature and interview data will be brought together to discuss the effect of UIC on innovative thinking among students to answer the second research question.

5.1. Value created by UIC

In the following, the data collected from literature and interviews about the value created by UIC will be compared and discussed. As stated in the research gap chapter, the research about the involvement of students in UIC is still scarce. However, it will be possible to identify the similarities and differences of UIC with and without students because the literature investigated mostly UIC without students, whereas the primary data collected is about UIC involving students. Furthermore, the interviewees also pointed out some aspects of the collaboration between students and industry that have not been mentioned in the literature about UIC.

5.1.1. Value generated for university

When analyzing the interview data, financial value was mentioned. The interviewees explained that it is important to have the industry perspective to be able to apply research results and commercialize them. In other words, universities have to work with companies and bring their knowledge to industry to make money from it and to continue to innovate like a circle of value creation. In the literature, financial value also came up, but in a different context. Public and private funding are the most commonly named value generated by UIC for university (Ankrah and Al-Tabbaa, 2015; Barnes, Pashby, and Gibbons, 2002; Hagen, 2002). Furthermore, in the USA licensing is another value created by UIC, especially for public universities to have an extra income. Earning further income through licenses and patents created by UIC is also mentioned in the literature (Ankrah and Al-Tabbaa (2015); Meyer-Krahmer and Schmoch, 1998).

In addition, university interviewees mentioned that it is popular, especially among younger researchers, to collaborate with industry to make their research more applicable. Collaboration with industry provides the universities with useful insights. J. Lee and Win (2004) agree and stated that UIC is necessary because technology development alone is not sufficient, and more value can be created by collaborating with industry and explore how the technology can be applied (*ibid.*). Furthermore, faculty members are exposed to practical problems, new ideas and to state-of-the-art technology (Ankrah and Al-Tabbaa, 2015). The industry's market knowledge

5. Discussion

can be used to develop technologies that are applicable and required, which is important for a technology's success (J. Lee and Win, 2004). Similar reasons are named by interviewees from university and industry and the data from literature and interviews seem to be congruent regarding this value created by UIC.

The university interviewees also explained that UIC can be used for branding and hence improve a university's reputation. The interviewees pointed out that the collaboration between industry and students can help to make a university known for its good education and hence increase the employability of students. Becker and Eube (2018) and Santoro and Chakrabarti (2001) confirm that it is very valuable for university if they are able to provide students with internships and graduates with employment opportunities. In addition, Ankrah and Al-Tabbaa (2015) agree that UIC can enhance a university's reputation, but they argue that the reason for that is that UIC gives the possibility to build credibility and trust for the academic researcher among practitioners (Ankrah and Al-Tabbaa, 2015). Therefore, one can conclude that improving a university's reputation is a value created by UIC, although there is some disagreement about the reason for the improvement of a university's reputation.

The university and student interviewees claimed that UIC is also valuable for university because it is a way for university to complement the education for students. Due to UIC, lecturers are able to make the education more practical and hence provide an even better learning experience and richer learning outcomes. The students learn more if they can apply and test the theories, which they have learned and when they interact and negotiate with practitioners. UCI Beall Applied Innovation for example was also founded with the intent to provide their students with a richer learning experience. Santoro and Chakrabarti (2001) also point out that universities want to collaborate with industry in order to provide real-life experience for their students and faculty members. The intention is to expose them to real business environments to get current insights into industrial research, how technologies are applied, instructional case studies and practical problems through projects (ibid.).

All in all, the value created by UIC named in the literature and the data gathered through interviews from this research seem to be similar. The most value is apparently created by additional income through licenses and practical industry insights for making the research results more applicable. Furthermore, although literature and interview results name different approaches, a university's reputation can be improved through UIC, which can lead to better employment opportunities for students. Another value created by UIC for university is the complemented education for students, which is more practical and leads to richer learning outcomes. In the following, the value created by UIC for students, which has been neglected in the literature so far, will be discussed.

5.1.2. Value generated for students

University and student interviewees stated that for students UIC is valuable because it allows them to not only learn theory, but to also get practical insights. According to the interviewees, students seemed to profit from applying their knowledge in practice, from testing the learned

5. Discussion

theory and from reflecting on the experience. For students, it appears important to apply theory in practice and to observe what happens and they might even want to develop new theories. So, students strive to question and to test what they have learned at university and might even improve it. According to the university interviewees, the ability to apply theory in practice and then to create something new out of it is the ultimate form of learning because creative thinking, which is a part of innovative thinking, is about reinventing. Furthermore, to learn how to apply theory in real-life and vice versa it is essential to have the practical context. Several authors cited in the literature review agree with these findings. Meredith and Burkle (2008) point out that although theoretical knowledge builds an important base, real-life experience is necessary to complete the learning cycle. In addition, also Starbuck (2001) emphasizes how valuable it is for students to apply theory to practice and gain real-world experience. Moreover, J. Lee and Win (2004) align with their fellow researchers and claim that students need the opportunity to connect their theoretical knowledge with practical experience by exposing them to industry.

Ankrah and Al-Tabbaa (2015) and J. Lee and Win (2004) state that having a practical perspective improves student employment opportunities. Santoro and Betts (2002) concur that companies often hire graduates with experience in UIC. Many of the interviewees agreed with the stated literature that having practical experience improves students' employment opportunities. Nevertheless, compared to literature the interviewees went into more depth and pointed out why. The student interviewees explained that if students made practical experiences during their studies, they are better equipped for starting to work right away, because otherwise the transition between university and first job can be overwhelming and difficult. The university interviewees concurred and said that it is valuable for university to enable students to gain practical experiences during their studies, because then they perform better during their first job. In consequence, companies are more satisfied, and the student employability rate of that university might go up. In addition, interviewees from all perspectives agreed that students can use UIC to get to know potential employers and use it as an opportunity to convince the employers of their capabilities. The interviewees also emphasized that students can use UIC as an opportunity to get to know an employer in more detail and decide if that industry and that company is the right fit. These arguments show that it is valuable for students to collaborate with industry before they graduate and start to work. This practical experience will ease the transition between university and first job. Furthermore, it is valuable because students can already get to know the company and decide if they want to work for that company and if yes, they can use the chance to convince the company of their capabilities.

The student interviewees that graduated from the corporate entrepreneurship master program all agreed that they learned how to be an entrepreneur and developed their innovative thinking due to the combination of lectures in the first year and the one-year innovation project in collaboration with a company during the second year. In addition, the university and student interviewees agreed that the students not only improve their learning when they can apply and test theory in practice, but they also said that UIC leads to real-life experience. That it is important to get experience and insights into how things work in industry. There might be factors

5. Discussion

influencing a project, which have nothing to do with education or knowledge and it is important to learn about that according to the student interviewees in order to run successful innovation projects. Blumenfeld et al. (1991) state that project-based learning is about engaging students in the investigation of a real-world problem given by industry. However, the student interviewees said that they developed their innovative thinking a lot, because their companies did not give them a specific problem, but they were able to identify an innovation potential themselves. Furthermore, the university interviewees also said that it is important to give students not already well-framed questions and to let them figure it out by themselves to increase their learning effect. However, the student interviewees agreed with Blumenfeld et al. (1991)'s claim that project-based learning especially increases the effectiveness of UIC for entrepreneurship education. Dooley and Kirk (2007) also consider UIC to be valuable and especially beneficial for entrepreneurship training because UIC brings together the strengths of university and industry. In addition, Assenza and Western (2017) agree that UIC is important for entrepreneurship training and entrepreneurship training in turn can be used to develop innovative thinking. So, there is agreement that project-based learning and working with industry is beneficial in any case for entrepreneurship education or training and developing innovative thinking, but the effectiveness can be increased even further by not giving students an already well-framed question according to the interviewees.

In addition, Ollila and Williams-Middleton (2011) propose real-world situational learning and suggest letting students experiment with venture creation to get to know the realistic development of commercial ideas and to learn how to apply their theoretical knowledge. This seems to be the approach that UCI Beall Applied Innovation is pursuing by encouraging its students to build their own start-up. They provide them with knowledge and support to make it possible. According to them, building up a start up is a valuable experience, which teaches students a lot, even if the start up is not successful. Furthermore, also Chalmers University seems to pursue this approach to some extent by offering guidance when students have an idea for a start up or by teaming students up with a researcher working on a start up.

Moreover, the interviewees not only mentioned the hands-on experience that they get from collaborating with companies as a value, but also mentioned being inspired, meeting interesting people and building a network with other innovative people. These were important values created by UIC mentioned by student interviewees and interviewees from industry, which have not been investigated in existing literature so far. Furthermore, the university and student interviewees pointed out that UIC also helps the personal development of students, which is also valuable and important.

All in all, there is an agreement between the statements made in the literature and the data collected from interviews about some value created by UIC for students. There is agreement about the importance of real-life experience and project-based learning for students. Nevertheless, there exist some diverse views on how well-framed the question should be regarding project-based learning. Furthermore, literature statements and interview data were congruent regarding improved employment opportunities for students due to UIC. Moreover, there were

also aspects of UIC discussed by interviewees not mentioned in the literature, which could be interesting for future research since the topic of UIC with a focus on students is not that well explored yet as stated in the research gap chapter.

5.1.3. Value generated for industry

First of all, many industry interviewees explained that universities provide networks of connections, knowledge of the latest technology and the strive to innovate. They stated that the development mindset of R&D is at the core of universities. George, Zahra, and Wood (2002)'s findings go into a similar direction and they state that collaborating with a university can grant a company access to the university's research network, which can not only include other universities, but also other companies. This access apparently can lay the foundation for additional and even more valuable collaborations (*ibid.*). Furthermore, Y. S. Lee (2000) claims that collaboration is useful to help industry to ensure the applicability of the research, which is very important for companies. Many interviewees explained that this desire of industry can be met, because as mentioned before, university also wants to get insights into what industry does. UIC seems to become a trend especially for innovation researchers, because in particular young researchers realize that applied research creates value and hence, they seek real-life projects with industry according to the interviewees.

In addition, also the positive effect of UIC on a company's reputation was mentioned in the reviewed literature and interview data. Student interviewees and interviewees from industry agreed that companies can use UIC for branding. They said that UIC with students can be used by companies to be perceived as being more innovative and make the company more attractive. George, Zahra, and Wood (2002) also claim that UIC improves a company's reputation. Santoro and Betts (2002) agree and mention that companies engaging with universities can be perceived as socially responsible businesses and hence a company's reputation can be enhanced.

Furthermore, Salter and Martin (2001) state that bringing in enthusiastic and critical students improves moral between employees and motivates them. University and industry interviewees agreed with the mentioned authors that students bring in energy, enthusiasm, interest, and curiosity. In addition, they said that students help to inspire and motivate employees. Nevertheless, the interviewees also pointed out that it depends on the employees if they let the students inspire them. Nakagawa et al. (2017) state that the students ask questions about the nature of a technology, business, and corporation, which leads to a fresh perspective. Jacob et al. (2000) agree and state that one of the biggest values of UIC for companies are the new perspectives, ideas and knowledge that come with the collaboration. They claim that the students' advantage is that they have the distance and space to reflect on what they observe without being hindered by practical concerns (*ibid.*). Overall, the interviewees agreed with the statement made by literature that students bring in a fresh perspective and reflection. They said that students question why a company is doing something and how it could be beneficial to apply theory. Furthermore, the interviewees agreed that students have a fresh mind and can observe the company objectively. In addition, interviewees for industry and university highlighted that students like to be

5. Discussion

innovative; they dare to question which leads to new perspectives and progress, which companies profit from. According to the interviewees, students help a company to progress because they question the status quo and make the companies rethink what they are doing. Students do not mind telling a company what they think. One reason the interviewees gave for that is that students have a non-threatening position in the company and therefore have more freedom to ask questions. This is also a reason why it is beneficial to collaborate with students before they graduate and to not just hire graduates.

However, especially the student interviewees disagreed with Jacob et al. (2000)'s statement that students are able to reflect what they observe without being hindered by practical concerns. According to the student interviewees, they were able to observe and develop an innovation project at first, but then when they tried to move it along, they encountered many practical difficulties. Furthermore, Nakagawa et al. (2017) state that the students' questions, which lead to a fresh perspective, show the importance of diversity and its impact on idea creation. The interviewees confirmed that statement and said that students bring diversity into teams. Some university and industry interviewees pointed out that students have a different way of thinking than the company. Therefore, according to them diversity is necessary for teams and a mix of age and background can help to find innovative solutions.

Moreover, several interviewees said that companies get access to knowledge due to the collaboration and that companies want to learn about innovation processes from students. In addition, through the interaction with students, companies learn about the latest discoveries and achievements in research and they also have the students that connect theory and practice for them. Salter and Martin (2001) claim that most graduates are well-trained and bring new knowledge to the industry (*ibid.*). Several university and industry interviewees agreed with Salter and Martin (2001)'s statement. Furthermore, student interviewees said that students can teach companies new innovation tools and new approaches like for example agile working or the business model canvas. In addition, Ankrah and Al-Tabbaa (2015) state that UIC is not only about patents and improved innovative capability, but also about helping companies to keep up with change and technological developments. Student and industry interviewees confirmed that and said that technology keeps changing faster and faster and companies need new perspectives, new mindsets to keep up and collaborating with students can give that to them. Nevertheless, Salter and Martin (2001) criticize that although students provide value to the company, most of the time graduates still have to be trained when starting at a company, which involves high costs. Especially, the student interviewees counter argued against this statement by explaining that the collaboration with companies prepares students for starting their professional career and eases the transition period. They also pointed out that this could save the company training costs later on. Furthermore, Ankrah and Al-Tabbaa (2015) argue that if companies collaborate with universities they get the chance to get to know the students and to hire the most talented graduates. Interviewees from all perspectives confirmed that the company can use the collaboration with students to get to know them and to decide if they would be a good hire or they are so impressed by the students' work results that they hire the student to implement it.

5. Discussion

In addition, the interviewees mentioned some value created by the collaboration between students and industry, which has not been mentioned in UIC literature yet. Industry interviewees, for example, pointed out that students are essential for companies to prepare for the future. According to them, students are the key to understand tomorrow's market and consumers. Furthermore, the financial benefits of working with students were also pointed out by interviewees. They stated that real-life projects with students give company a team of students spending a lot of time thinking about the issue and working on it, whereas a consultant would cost a lot of money.

All in all, there is an agreement between the statements made in the literature and the data collected from interviews about some value created by UIC for industry. Both agree that through UIC industry gets access to a university's network and knowledge. Furthermore, they agreed that UIC leads to more applicable research. In addition, there was a consensus that there can be a positive impact on a company's reputation and how it is perceived due to UIC. Moreover, it was mentioned in the literature and by interviewees that students bring in a fresh perspective, reflection, inspiration, energy, and enthusiasm, which can also motivate the employees. Companies also get access to new knowledge and new insights from research through the collaboration. Another value is that the collaboration with industry prepares students well for starting their professional career, which might save the company training costs later on. All in all, researchers in the area of UIC have started to think about the value that collaboration between industry and students could create, but it still seems superficial compared to the information uncovered by the interview data. Therefore, future research should focus on industry student collaboration in more depth.

5.1.4. Influencing factors of UIC

In the following, the research results regarding the influencing factors of UIC from the literature review and the interviews will be compared and discussed. Although the discussed influencing factors of UIC from the literature review are rather related to the collaboration between industry and university researchers, some are still similar to the ones mentioned from the interviewees regarding the collaboration between industry and students.

First of all, especially the university interviewees emphasized that the selection of the collaboration partner is very important to make sure that they are open to students' ideas, value the work the students put in and do not take advantage of the students. Barnes, Pashby, and Gibbons (2002) agree that the first step is to carefully select the collaboration partner, because it is crucial for a collaboration's success. Furthermore, Jacob et al. (2000) mention the importance of reflection time for researchers because they need space to reflect on what they have observed at the company and what solutions they might develop in collaboration with their industry partners. The interviewees, especially the student interviewees, agreed with that and emphasized that they have to be at a company for a longer time to be able to develop an innovation project. Furthermore, Nakagawa et al. (2017) investigated a UIC entrepreneurship education program in Japan and they discovered that the independence offered by the program

5. Discussion

motivated the participants, because they had the opportunity to pursue new ideas and new ways of thinking, independent from their everyday work. Many interviewees from different perspectives agreed with that statement and said that it helped to bring in students that did not have everyday responsibilities like a regular employee. Depending on the company, they had the time and freedom to pursue their ideas to develop an innovation project.

Moreover, the university interviewees pointed out that their first responsibility as a lecturer was to ensure that the real-life project fulfills the learning goals of the course to ensure a good education for the students. Huhtelin and Nenonen (2015) agree with that and argue that the goals of the collaboration have to be set in the beginning, and it is essential to identify common objectives. Furthermore, Giuliani et al. (2010) discovered that a higher position at a university, for example full professor, associate professor or senior researcher, leads to more UIC, because UIC is often initiated through personal contacts and more senior researchers have probably built a large network of contacts during their career that they can draw from to find suitable industry partners to collaborate with (Giuliani et al., 2010; Haeussler and Colyvas, 2011). By contrast, the university interviewees did not mention that seniority plays a role for the establishment of UIC. Nevertheless, they agreed that UIC is often initiated through personal contacts and that they have built their networks over time. Furthermore, some of the university interviewees mentioned that it required some effort to convince the university administration of UIC's benefits for students and then a more senior person might have a better negotiation position, but the interviewees did not state that explicitly. In addition, Giuliani et al. (2010) found that younger academics are more willing to collaborate with industry than their senior colleagues. This is consistent with the statements of some university interviewees that pointed out that especially younger researchers want to collaborate with industry to make their research more applicable.

Another influencing factor of UIC is proximity. Many of the interviewees made the experience that proximity is important for establishing UIC and makes it more likely. D'Este, Guy, and Iammarino (2013)'s research results confirm that and show that geographical proximity increases the probability of UIC. By contrast, Torre and Rallet (2005) argue that geographical proximity is not required permanently, but only during some time periods. Especially, the student interviewees disagreed with that and pointed out that they spent a lot of time at the partner company to observe everything and to network with employees to get more information for their innovation project. Moreover, after an UIC is established, the physical space where the participants meet, seems to be an important factor for the collaboration's success according to Huhtelin and Nenonen (2015) and they claim that campus management is an important success factor for the collaboration between students, researchers, entrepreneurs and industry. For example, they claim that it is useful to bring people from different disciplines together because multidisciplinary exchange is very valuable (ibid.). The interviewees from UCI Beall Applied Innovation, in particular, agreed with these research findings. Their goal when founding UCI Beall Applied Innovation was to bring people from different disciplines together and to create an ecosystem of innovation and entrepreneurship. So far, they agree that this is a successful approach to UIC. In addition, Huhtelin and Nenonen (2015) highlight the importance of "Ba"

5. Discussion

for the success of UIC. “Ba” supports the trust formation among the UCI participants (*ibid.*). Trust is essential for the success of UIC and decides if a collaboration is high- or low-performing (Bstieler, 2006). The interviewees did not mention “Ba”, but they mentioned trust as important for the collaboration. The student interviewees said that if the company trusts them, they can more think and act on their own. Furthermore, the student interviewees also mentioned that sometimes there was a lack of trust on the students’ side, because there was internal political tension that they did not know about or people acted differently than they said they would, for example, which led to frustration on the students’ side. Therefore, one could assume that trust could help to make these collaborations even more successful, which would create more value for all parties involved.

Last but not least, accompanying services, for example in form of collaboration facilitators, were mentioned in the reviewed literature (Caldwell and O’Reilly, 1982; Huhtelin and Nenonen, 2015; Jones and Burgess, 2010; Nakagawa et al., 2017). The cited authors agreed that the course of the collaboration can be influenced by some sort of facilitator. How this facilitator is called, and the level of involvement varies in the reviewed literature, but there seems to be a consensus that this role has an influence on the outcome of the collaboration. As part of this research project, the company First to Know was investigated. Whereas, the mentioned facilitators in the literature, only come in after the UIC is already established, First to Know also tries to initiate UIC proactively on their own in addition to facilitating the collaboration. According to the interviewees, First to Know approaches lecturers and companies and tries to connect them through projects. Furthermore, they are a good resource to enable multidisciplinary collaboration according to the interviewees, which is also highlighted as important in the reviewed literature (Huhtelin and Nenonen, 2015). In the analysis part about First to Know, there is a part about aspects First to Know could improve. Nevertheless, if only the aspects are considered, which First to Know already does well, one can see that an organization like them can have a positive influence on UIC. Huhtelin and Nenonen (2015) highlight the importance of “Ba” for the success of UIC, which is the context through which the collaboration partners share feelings, emotions, experiences, and mental models. This is important for knowledge creation and exchange and “Ba” supports the trust formation among the UCI participants, as mentioned before (*ibid.*). Based on the interview data analysis, First to Know could provide this context called “Ba”. According to different interviewees, First to Know helps to build trust between the collaborating parties and helps them understand each other, because they have insights into university and industry.

Furthermore, Giuliani et al. (2010) and Haeussler and Colyvas (2011) found that UIC is often initiated through personal contacts and more senior researchers have probably built a large network of contacts during their career that they can draw from to find suitable industry partners to collaborate with, which makes UIC more likely. Many of the interviewees, especially from university, praised First to Know’s large network. There was some disagreement among the university interviewees if an additional network is necessary, but it seems like it is good for university employees that do not have a large network yet or no time to carefully select industry

5. Discussion

partners for projects. It seems a facilitator like First to Know can help during the initiation of UIC to compensate the network size of the university employee and/or save him time. In addition, Huhtelin and Nenonen (2015) claim that multidisciplinary exchange is very valuable. Many interviewees agreed with that and praised First to Know for enabling that. According to the interviewees from university and industry, they could not organize multidisciplinary collaboration on their own. As mentioned before, research about the involvement of students in UIC is still scarce and no clear frameworks and processes to encourage it are offered at this time. Nevertheless, a facilitator or mediator for initiating and maintaining UIC between students and industry could play an important role based on the interview data.

In addition, since the research about the involvement of students in UIC is still scarce, the interviewees also pointed out some influencing factors of the collaboration between students and industry that have not been mentioned in the literature about UIC. The importance of culture was highlighted. For example, UIC thrives in the Bay area, because anything seems possible and failure is accepted. Furthermore, UIC at Stanford University and Berkeley apparently works differently, because the students come in contact with startups and big tech companies more naturally. This might be the reason why UIC works so well in the Bay area because businesses are very open to work with students. It seems like the universities in the Bay Area are very well connected to the companies there and the companies are open to take in students that have ideas and to work on it together. Furthermore, several interviewees emphasized the influence of leadership on UIC. The consensus among interviewees was that leadership has to be interested in research to make UIC possible and it is essential for the area on what students are allowed to work on and how much decision freedom they have. Furthermore, the interviewees analyzed what effect company size has on UIC. Their conclusion was that in general, smaller companies seem more interested in UIC and implementing results, whereas larger companies have more resources to collaborate, but the results might not be that important to them or too complex to implement given existing processes.

All in all, the data from the literature and from the interviews both state that the collaboration partner selection plays an important role for UIC. Moreover, the negotiation of the collaboration goal also influences the collaboration's success. Another important influencing factor was personal contacts and network. This factor was mentioned both in the reviewed literature and interview data. However, there were different opinions regarding the relevance of seniority of the researcher for the personal network. While seniority plays an important role in the reviewed literature for UIC, the interviewees only mentioned that having a large network is beneficial. Nevertheless, in addition they agreed that especially younger researchers are inclined to collaborate with industry. Furthermore, geographical proximity also has a positive influence on the initiation of UIC according to the reviewed literature and interview data. However, there was some disagreement about how much time should be spent close to each other during the collaboration. Another aspect, which the data agreed on was trust. Trust between the participants seems to be essential for successful UIC. Furthermore, the role of a facilitator was discussed. In the reviewed literature, the benefits of a facilitator for the course of UIC was mentioned. The

interviewees agreed with that and added that a facilitator is also important for UIC initiation. Having a facilitator can have a positive influence on UIC, because it can help to initiate UIC, enable multidisciplinary collaboration, form trust among collaborators and help them to understand each other. Furthermore, a facilitator can add to an existing network and save the parties time by matching suitable collaborators. In addition, since the research about the involvement of students in UIC is still scarce the interviewees also pointed out some influencing factors of the collaboration between students and industry that have not been mentioned in the literature about UIC. The interviewees added culture, leadership and company size to the influencing factors mentioned in the reviewed literature.

5.2. Effects of UIC on innovative thinking of students

In the following, the reviewed literature from Section 2.1 about requirements for innovative thinking will be compared and discussed with the analyzed data from Chapter 4 to examine the effects of UIC on innovative thinking of students.

First of all, from the industry interviewees' perspective, it is beneficial to have a mix of different people and students to bring diversity into teams. The interviewees from university also agreed that it is good to have a fresh perspective when looking at materials and claimed that students usually think differently than the company. Lundvall (2007) agrees that knowledge creation and innovation require interaction between actors with different backgrounds and experiences. This claim was confirmed by the interview results. In other words, collaboration between industry and students leads to diversity, which is beneficial for innovative thinking. However, innovative thinking is not only created by the right circumstances like diversity, but it also has to be learned.

From the university perspective, innovative thinking is a learning experience. Learning innovative thinking is hard work and students need a practical context to develop it. Furthermore, the interviewed graduates from the corporate entrepreneurship master program all agreed that developing innovative thinking is a learning process, which requires theory, but also practical insights and continuous practice. They did an innovation project for a year with a company and they were allowed to bring in their own ideas. So according to them, they developed their innovative thinking because it was about thinking for themselves and seeing what happened when they tried something out. They agreed that this was a good way of learning and a good opportunity to practice innovative thinking a lot. Drucker (2002) agrees with the interviewees and explains that the majority of innovations are not serendipitous and therefore require a conscious, purposeful search for opportunities to innovate. Hence, successful innovators have to be committed to the systematic practice of innovation (*ibid.*). So, literature and interview data both state that innovative thinking is about practice and the continuous search for innovation opportunities. The collaboration with industry could give students the possibility to do that.

Furthermore, since developing innovative thinking is a learning process, university interviewees pointed out that students have to learn to think outside the box, to challenge things, to make choices and how to deal with failure. The student perspective interviewees explained that

5. Discussion

innovation students are likely already interested in innovation from the start and willing to innovate, otherwise they would choose another subject. University interviewees agreed with that assumption and had the same impression during the program selection processes, so the students are already innovative thinkers from the start, but they also become better. According to Hill et al. (2014) the willingness to innovate is the first important step for becoming innovative, but it is also crucial to build the ability to innovate. As mentioned before, students are already interested in innovation and willing to innovate. They might already be innovative thinkers when they start the program, but the program still helps to build their innovation ability further. Both interviewees from university and student interviewees agreed with Hill et al. (2014) that the willingness to innovate is not enough and that the ability to innovate has to be build. They both agreed that programs, which connect theory with practical experience help students build their ability to innovate. First, they are given the theory and then they can apply it in practice and thereby develop their innovative thinking.

In addition, practical experience during their studies is a good learning opportunity for students for becoming an innovator, because they are not afraid of calling things out and suggest new approaches. These arguments show the value of the collaboration between students and industry before students graduate, because students do not have to be scared of calling things out that should be done differently. Nakagawa et al. (2017) agree that these are important traits for innovators because innovators require a way of thinking that aims at the realization of opportunity, rather than the risk-averting decision making common in hierarchical organizations. Based on the analyzed interview data from student and industry interviewees, one can see that students are not scared of telling the truth about what they find. They ask questions and try to identify opportunities to innovate for the company. Students dare to question, which leads to progress and companies profit from that. They are already trained at university to question things. At the company they can practice it and question status quo to help the company to become more innovative. In addition, students are not as close to the project as employees and have another fresh perspective and ideas to do something differently or new. SL₂ said that in his experience “students usually don’t feel like scared. They just don’t have fear to tell it as it is because they, they come in for a short while, they ask some questions, do some digging, and then they come back and say, this is what we found out. Like this is how we experience it. And maybe it’s a completely new vision for somebody who’s just too close to understand it”. S₁ confirmed that and said that “as students surrounding these kinds of projects, you would get the unique opportunity to be fearless and to dare to be, be radical and dare to actually challenge the company and to ask additional questions because you don’t have to worry about getting fired”.

Moreover, many interviewees from industry have mentioned that students not only question what companies take for granted, as mentioned before, but the collaboration with companies also leads students to break frames and to question what the students might take for granted. S₃ said that “we actually got to experience a lot of the things that we were reading about so we could connect what we were doing to the theory and agree or disagree with the theory in

5. Discussion

our theses, which made it possible for us to both have the experience but also to reflect on it in a very good way". So, students were able to test what they have learned and compare it to reality. Furthermore, S_1 also said that he realized due to the project that not all companies are working in an innovative way, but when talking about innovation at school they use examples from companies that are really good at innovation. Interviewees from university also said that it is important for students to get real-life experience, because some students are still very naive and think that all companies work in an innovative way. So, it is valuable for students to get to question these assumptions, to experience that reality differs from the classroom, which is also an important learning for innovative thinking. Ness (2015) agrees with that and argues that innovative thinking means breaking frames. Frames are expectation structures and assumptions that we use to process new information, which can be useful. Nevertheless, frames are often the sources of cognitive biases (ibid.). Nonaka and Takeuchi (1995) also state that it is important to question everything, especially what you take for granted (p.23). I_2 for example said that the students "have a picture of innovative thinking when they enter the company and maybe it's being refined after a while, working together with companies regarding specific ideas and projects".

Several industry interviewees and student interviewees pointed out that it depends on how supportive the company is and how the project is set up for students to develop innovative thinking. Chen et al. (2013) define innovation capability as the "ability that a person (innovation subject) is able to get novel achievements through some activities in an ideal environment" (p.1199). The industry interviewees and student interviewees also described an ideal environment that should be in place for students to develop their innovative thinking. An environment where students have the freedom to experiment, to apply and test the theory that they have learned with support from the company to help them become more innovative. That could be the difference between doing a project in a university setting with pre-determined questions and doing a project at a company. Problem solving skills are an important aspect of innovative thinking and will be explored in more depth in the next paragraph.

In addition, Chen et al. (2013) state that innovation capability is about how a person solves a problem. They claim that innovation capability is about the awareness on how something can be improved and what aspects could lead to difficulties and to find creative solutions (ibid.). The interview data is consistent with Chen et al. (2013)'s statement that the awareness on how something can be improved is important for innovation capability and hence for innovative thinking. S_4 explained that his real-life project showed him how many different aspects have to be considered when trying to improve or create something. He made the experience during his one-year innovation project that "entrepreneurship or innovation, I don't think that you can really simulate it, to some degree. If you're not really out there talking to customers, to suppliers to dealers to employees. I mean everyone that is part of the stakeholder mapping, I don't think you can really create something that has enough value for someone to really invest. I mean you can create something that is innovative, but I think if you, if you don't really have the ecosystem of people to really discuss this with, it's very difficult to really learn what it takes

5. Discussion

to create something new because we realized that that was really, really hard once we got to know all the people and where like the as is state, I mean really looking into, okay, what, where is this company in terms of innovation? Where's this company in terms of digitalization?"

Nevertheless, some interviewees disagreed with Chen et al. (2013) and explained that it is also important to collaborate and learn how to deal with not well framed kind of questions, because sometimes the problem is not clear and has to be identified, before a solution can be found. So, for the interviewees innovative thinking is also about being able to identify a problem or an area with improvement potential and not just about identifying a problem solution. Furthermore, according to some interviewees, innovative thinking also includes to learn how to identify the relevant context, the different kinds of perspective, the people that should be involved and then to reflect on it and question it again. This is related to the second part of Chen et al. (2013)'s statement that innovation capability is also about the awareness of aspects that could lead to difficulties, several student interviewees pointed out that the real-life projects helped them to get an understanding of all the factors that influence the course of a project. Internal politics were a commonly mentioned difficulty. S_1, for example, pointed out that "we do have a lot of courses in entrepreneurship. I mean that is all about having, having an idea or like spotting an opportunity in the market and pursuing that successfully. But we would need to transform that knowledge into the corporate setting. These things are difficult to understand just by looking at the theory. It is something that I do think that you need to experience more to learn". In other words, students learn how to lead an innovation project and what obstacles they may encounter in theory, but then they also run an actual innovation project to get the practical experience. They agreed that it is crucial to have real-life projects because then students experience what aspects could lead to difficulties like the uncertainty, budget constraints, political challenges, the promotion of their project.

Depending on the company, students have the freedom during innovation projects to bring in their own ideas and to test and experiment if implementing the idea would be beneficial for the company. S_3 for example said that Volvo just told her "do whatever you want as long as it's good". In addition, students can also test and experiment by founding their own start up. That is the approach that UCI Beall Applied Innovation and partly the Chalmers innovation office pursue. Students can test and develop their ideas while receiving support from the university and through feedback from industry. At UCI Beall Applied Innovation for example, students get industry feedback through the Innovation advisor network. This testing and experimenting are important for developing innovative thinking according to the interviewees. Hill et al. (2014) agrees with that and explain that creative agility is the ability to test and experiment, which is important to develop for being able to innovate. Creative agility is one of three capabilities, which Hill et al. (2014) recommend building in order to foster innovative thinking. These three capabilities are creative abrasion, creative agility and creative resolution, which can be found in Figure 2.2 (ibid.). Creative abrasion is the ability to generate ideas through interaction. In a first step, students can build creative abrasion by interacting with their classmates. During the corporate entrepreneurship master, the students work a lot on projects in teams with diverse

5. Discussion

members during class as a preparation for the one-year innovation project. In a second step, students can interact in a practical setting with relevant stakeholders for the innovation project. S_4 made the experience during his one-year innovation project that it is important to interact with people to innovate. He said that “I don’t think you can really create something that has enough value for someone to really invest. I mean you can create something that is innovative, but I think if you, if you don’t really have the ecosystem of people to really discuss this with, it’s very difficult to really learn what it takes to create something new”. Moreover, creative resolution is the ability to make decisions that combine diverse and maybe even conflicting ideas (Hill et al., 2014).

According to the interviewees, due to the collaboration with a company they learned how to bring together different, sometimes even conflicting, expectations during an innovation project. S_4 for example said that he had many discussions with his professor and the company to find an idea that was radical, but not too radical for the company. Nevertheless, according to L_2 students challenge both academia and industry. They are the best interface to challenge both of them. He said that “I have worked with students before so I have only good experience of that, I think I need to be challenged and the academy needs to be challenged as well. Students are the best interface to challenge both of us”. So, students actually learn during these real-life projects to handle different, sometimes even conflicting ideas and expectations, which is an important part of innovation management. All in all, according to Hill et al. (2014) all these capabilities are necessary for being able to innovate and according to the interview data students develop these during UIC.

Overall, several student and industry interviewees agreed with Hill et al. (2014) and mentioned that UIC develops students’ creative thinking, which in turn is important for developing innovative thinking. As mentioned before, many of the interviewees from industry have praised that students question a lot, challenge the status quo and lead to new thinking among employees (S_L2, L_4, L_2, L_3). The challenging and changing of existing thinking patterns is important for the development of creative thinking according to Chen et al. (2013). S_1 agreed that creative thinking is very important for becoming innovative and therefore he explained that students would have needed creative thinking courses to be more innovative during the projects because doing something unusual does not mean that it is innovative. He pointed out that “one thing that I lacked throughout the master’s program was to actually focus on how to be creative. So in order for you to be innovative, you need to have creative ideas. And then the second part of that is having the possibility to actually implement them. I felt that we weren’t really trained in being creative, I didn’t know that at the time. But since I started working as an innovation consultant, I’ve gotten a better sense of what being innovative actually means”. By contrast, his classmates argued that they were still able to develop their innovative thinking during the master program (S_3, S_2). Nevertheless, creative thinking seems to be an important factor for innovation in literature and practice and UIC nurtures it.

In the previous paragraphs the reviewed literature from Section 2.1 about requirements for innovative thinking was compared and discussed with the analyzed data from Chapter 4 to

5. Discussion

examine the effects of UIC on innovative thinking of students. One part of Section 2.1 were also the influencing factors of innovative thinking and innovation. The influencing factors of innovative thinking and innovation were outlined in Section 2.1.3 and will be used in the following to examine the effects of UIC on innovative thinking of students when discussing it with the analyzed data from Chapter 4.

Many of the interviewees pointed out that innovation education is very important for developing innovative thinking. They said that innovative thinking can be taught and learned. The student interviewees that graduated from the corporate entrepreneurship master program explained that their program showed them that innovative thinking can be learned. They were prepared during the first year with knowledge and by collaborating in teams with people with diverse backgrounds and during the second year they had a lot of time to practice how to think in an innovative way when collaborating with a company. Chen et al. (2013) agree with that and claim that students require training to build their innovation capability, because it can help students to become more aware of improvement potential, problems that could occur and their associative ability. Furthermore, Chen et al. (2013) said that training can help students to question existing thinking patterns and to develop comprehensive divergent thinking. The student interviewees agreed with that, because, as mentioned before, the student interviewees pointed out that they worked a lot in teams and also together with people with different backgrounds. That helped them to train divergent thinking because they got to know different perspectives. In addition, the student interviewees agreed with Cummings and Bridgman (2016) that the collaboration with people from different backgrounds led to more ideas and different problem-solving approaches.

Nevertheless, Gupta (2011) argues that traditional didactic classroom models are mostly about providing students with information that they passively absorb and just memorize it to pass an examination. Therefore, Franco and DeLuca (2019) promote an active learning approach through constructivism to foster critical thinking and problem-solving among students. Constructivism is about helping the students to develop their own solution to a problem instead of guiding them to a solution (Dagar and Yadav, 2016). Furthermore, a constructivist educational approach teaches students to look for solutions outside confined and compartmentalized formats (Franco and DeLuca, 2019). Several interviewees agreed with that. The interviewees argued that innovation education and training are important for developing their innovative thinking, but they also said that they needed the practical parts to apply what they have learned to develop their innovative thinking even further. Based on the analyzed interview data, it became clear that it is important for developing innovative thinking to identify solutions on their own and also solutions that seem uncommon at first. The university interviewees stated that it is also important for students to collaborate and learn to work with not so well framed kind of questions. To develop innovative thinking, students should not only find a solution to a specific problem, but also learn to question if the problem is really the problem. The master program “corporate entrepreneurship” is a lot about doing projects and solving problems that the students have not thought about before according to the program graduates. S_3 said for example that the scope for her project was

5. Discussion

given, but “otherwise they just said, do whatever you want as long as it’s good”. So, the students learned to critically think and identify a problem or improvement potential by themselves and then to develop a solution. Moreover, these real-life projects teach students to evaluate if there are other factors that influence the course of the project and how interested employees are. For example, S_3 realized that “there was a lot of turbulence that didn’t really have to do with us in the department where we were and I think maybe listening to also what we had discovered might have increased that. So that might have been the reason for not wanting to hear what we had to say sometimes”. Furthermore, UCI Beall Applied Innovation for example promotes active learning by supporting its students to develop their own start up. The students also critically think and identify a problem or improvement potential. Then they think about how they can solve it and then in a next step how to turn it into a business (U_4, IU_2)

Moreover, many industry interviewees said that leadership has a significant influence on UIC, because it is the first important step for bringing in students. Leadership also influences the course and outcome of real-life projects, because the decision if students have the freedom to propose new ideas or if they should develop already existing ideas depends on it. According to the student interviewees, if students have the freedom, they develop a whole innovation project on their own, considering the company’s situation. The interviewees from industry also agreed that it is important for leaders to give the students freedom for exploration, to be open to suggestions coming from students and to take it seriously. A leader can always come up with an idea by himself, but it might not be the best one. Hill et al. (2014)’s thoughts went into a similar direction and they claim that it is essential to identify and develop innovation leaders that are able to nurture both individual and collective innovativeness. These innovation leaders have to create the context in which innovation can happen (*ibid.*). Birdi, Leach, and Magadley (2016), for example, found that departmental support for innovation is related to employees’ idea generation. Although Hill et al. (2014)’s and Birdi, Leach, and Magadley (2016)’s statements are rather about innovation at a company in general it can also be applied to the collaboration between students and companies.

Furthermore, culture and openness were mentioned by the interviewees to be important for developing innovative thinking. Especially, in the Bay area in California UIC seems to be more established because the culture there is promoting openness and interaction between students and industry. The culture there is about trying out things and failure is accepted, so it is easier to bring in ideas. Nevertheless, it was also pointed out by interviewees that are not from the Bay area that the cultural difference between university and industry has to be considered and might limit collaboration opportunities. Kim, Park, and Paik (2018) agree that culture has an important impact on the level of innovation. Furthermore, Merx-Chermin and Nijhof (2005) said that it is important to create an atmosphere of trust, open-mindedness, and commitment (*ibid.*). So it seems like Kim, Park, and Paik (2018) and Merx-Chermin and Nijhof (2005) are correct and that culture and openness are important for the collaboration between students and companies and for the ability to develop innovative thinking, as can be observed in the Bay area. Moreover, student interviewees, mentioned that it depends on the company how free students

5. Discussion

are during the project and what kind of ideas they can bring in, but this freedom is important for the development of innovative thinking according to them. They said for example that the more traditional companies rejected ideas that were too radical. Furthermore, they also said that if no one was responsible or assigned for the implementation of the project's results and really pushed it nothing happened with it. Furthermore, the interviewees said that insufficient resources can be a problem. The interviewees stated that it is difficult for smaller companies to collaborate with students due to financial limitations and for larger companies it is hard to assign a budget for student collaboration, especially if the outcome is not clear from the beginning, although they have the financial means to collaborate. Kim, Park, and Paik (2018) confirm the interviewees' statements and also claim that organizational rigidity and insufficient resources can hinder the development of innovative thinking.

To sum up, innovation and innovative thinking require interaction between actors with different backgrounds and experiences. Students can experience diversity of thought when working in teams at university or at a company. Moreover, there was agreement that innovative thinking is a learning process, which requires not only theory, but also practical insights and a lot of practice to develop it for the students. Furthermore, innovators require a way of thinking that aims at the realization of opportunity rather than being risk-averse. Based on the analyzed interview data, students are not scared of telling the truth and asking questions. Collaboration gives students opportunity to be fearless and to dare to challenge the company. So, this practical experience during their studies is a good learning opportunity for students for becoming an innovator. Innovative thinking is also about breaking frames and to question everything. Students not only question what companies take for granted, but the collaboration with companies also leads students to break frames and to question what they take for granted. It is valuable for students to get to question assumptions, to experience that reality differs from the classroom. Furthermore, students might already be innovative thinkers when they start an education program about innovation, but the program still helps to build their innovative thinking further, if it involves practical units. The willingness to innovate is not enough and the ability to innovate has to be built. Programs that connect theory with practical experience help students develop their innovative thinking. In addition, there was agreement that the awareness on how something can be improved is important for innovative thinking and that students can build this awareness by collaborating with industry. Furthermore, innovative thinking is also about the awareness of aspects that could lead to difficulties and real-life projects help students to get an understanding of all the factors that influence the course of a project. Moreover, in the literature the importance of creative thinking for innovation was emphasized. There was some disagreement if students practice this enough during real-life projects or if they need creative thinking courses. The interviewees agreed that an education program that combines theory and practice will help students to build innovative thinking. In addition, students can also develop creative and innovative thinking by founding their own start up. Furthermore, there was agreement that innovative thinking can be taught and learned and that UIC can be used for that. Moreover, it was agreed on by the interviewees that it is important for students to collaborate

5. Discussion

and learn to identify problems not only solutions for problems. In addition, the importance of leadership and culture were mentioned to be important for innovation. Nevertheless, culture and leadership were not mentioned as influencing factors in Section 2.3.4. However, there was agreement among the interviewees in Chapter 4 that culture and leadership are very important for a successful collaboration between industry and students. For example, it depends on how supportive the company is and how the project is set up for students to develop innovative thinking.

Furthermore, reflecting again on the framework introduced in Section 2.4, the discussion results allowed to refine the framework. The refined framework can be found in Figure 5.1. Number one refers to the value, which the collaboration between industry and students creates for students. Students receive real-life experience, project-based learning and can prepare for their career. Industry, on the other hand, profit from collaborating with students because they get a fresh perspective, the students reflect on what the company does, inspire the employees and give the company new knowledge and insights from research (number two). Furthermore, university enables this industry student collaboration by providing students with theory (number three). Moreover, the data analysis of the reviewed literature and interviews showed that the traditional collaboration between university (researchers) and industry provides value for both sides by exchanging knowledge. Furthermore, university receives additional income through licenses and practical industry insights to make their research more applicable, which in turn also

University-industry collaboration and its effect on innovative thinking among students

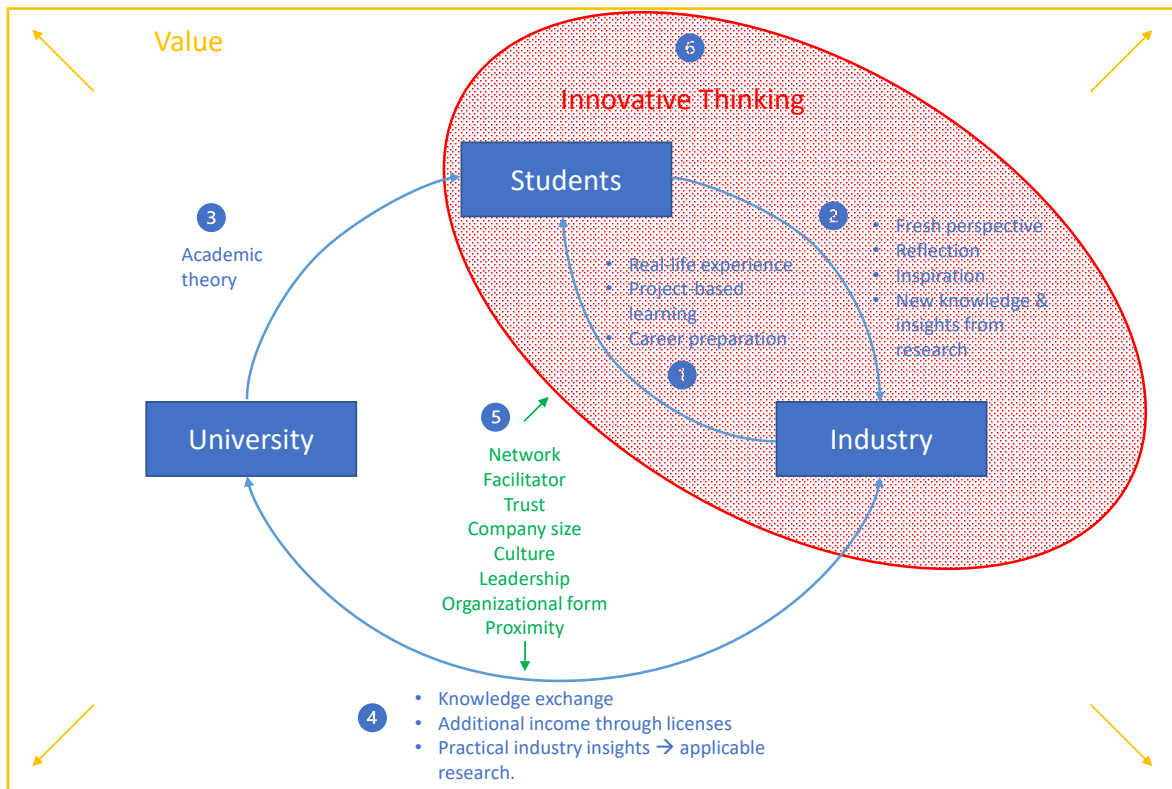


Figure 5.1.: Framework of research findings.

5. Discussion

benefits industry (number four). In addition, the collaboration between industry and students and also between industry and university is influenced by certain factors, which are listed under number five. These influencing factors come from the reviewed literature and the interviews to have a comprehensive overview. Number six symbolizes the outcome of industry student collaboration. The development of innovative thinking among students.

6. Conclusion

In the following chapter, the conclusion will be drawn. First, the results will be connected back to the research questions. Then the theoretical and practical implications will be outlined. Furthermore, the limitations of this research project will be pointed out and recommendation for future research will be given.

6.1. Connection to the research questions

This research project was about investigating what value is created when university and industry collaborate with a focus on the collaboration between industry and students. Furthermore, the effect of such collaborations on innovative thinking among students was examined. The research questions were:

RQ1: What value does university-industry collaboration create when students are involved?

RQ2: What are the effects of university-industry collaboration on innovative thinking among students?

As could be seen throughout this research paper, the reviewed literature rather examined the collaboration of industry and researchers and not industry student collaboration. So far, the literature on industry student collaboration is still scarce. Especially, research about value created by UIC for students has been neglected in the literature according to Barnes, Pashby, and Gibbons (2002) and Huhtelin and Nenonen (2015). This research project aimed at closing this gap. To do so, not only literature and collected data about the value created for students was examined, but also about value created for university and industry to get a comprehensive overview and to see where the collaboration with students can add value. Moreover, in order to get a more international overview of UIC, interviews were not only conducted in Sweden, but also in California, which is known for its innovative companies and universities.

First of all, to answer the first research question, the main research results regarding the value created by university-industry collaboration when students are involved will be highlighted. The research results show that the value created by UIC for university based on literature and the data gathered through interviews seem to be similar. The most value is created by additional income and industry insights. Furthermore, although literature and interview results name different approaches, a university's reputation can be improved through UIC.

Moreover, there is agreement between the statements made in the literature and the data collected from interviews about some value created by UIC for students. There is agreement

6. Conclusion

about the importance of real-life experience of students and project-based learning. Nevertheless, regarding project-based learning exist some diverse views on how well-framed the question should be. Interviewees argued that it is important for developing innovative thinking to not only solve problems, but also to identify them. Furthermore, literature and data were congruent regarding improved employment opportunities for students due to UIC and the created value when students and companies collaborate before students graduate. There were also aspects of value created for students due to collaboration with industry discussed by interviewees not mentioned in the literature. For example, they pointed out that students are inspired because they meet interesting people and also develop personally due to the collaboration with industry. These unexplored aspects could be interesting for future research.

Moreover, the interviewees not only mentioned the hands-on experience that they get from collaborating with companies as a value, but also mentioned being inspired, meeting interesting people and building a network with other innovative people. These were important values created by UIC mentioned by student interviewees and interviewees from industry, which have not been investigated in existing literature so far. Furthermore, the university and student interviewees pointed out that UIC also helps the personal development of students, which is also valuable and important.

Regarding industry, there was agreement between the statements made in the literature and the data collected from interviews about some value created by UIC for industry. Both agree that through UIC industry gets access to a university's network and knowledge. Furthermore, they agreed that UIC leads to more applicable research. There was also a consensus that there can be a positive impact on a company's reputation. Moreover, it was stated in the literature and by interviewees that students bring in a fresh perspective, reflection, inspiration, energy, and enthusiasm, which can also motivate the company's employees. Through the collaboration companies also get access to new knowledge and new insights from research. Another value for industry is that the collaboration prepares students well for starting their professional career, which might save the company training costs later on. Furthermore, collaborating with students can also help companies to prepare for the future. All in all, researchers in the area of UIC have started to think about the value that collaboration between industry and students could create, but it still seems superficial compared to the depth of information uncovered by the interview data. Therefore, future research should focus on industry student collaboration in more depth.

The research results regarding the influencing factors of UIC from the literature review and the interviews were also compared and discussed. Although the discussed influencing factors of UIC from the literature review are rather related to the collaboration between industry and university researchers, some are still similar to the ones mentioned by the interviewees regarding the collaboration between industry and students. All in all, the most important influencing factors that the data from the literature and from the interviews both stated and agreed on were collaboration partner selection and negotiation of the collaboration goal. Another important influencing factor mentioned was personal contacts and network. Furthermore, geographical proximity also has a positive influence on the initiation of UIC according to the reviewed lit-

6. Conclusion

erature and interview data. Another aspect, which the data agreed on was trust between the participants. Furthermore, the role of a facilitator was discussed. In the reviewed literature, the benefits of a facilitator for the course of UIC was mentioned. The interviewees agreed with that and added that a facilitator is also important for UIC initiation. In addition, since the research about the involvement of students in UIC is still scarce the interviewees also pointed out some influencing factors of the collaboration between students and industry, which have not been mentioned in the literature about UIC. The interviewees added culture, leadership, and company size, which could be investigated in future research to help industry to make the collaboration with students a success.

Regarding the second research question, the research project has uncovered interesting results. In Section 5.2, the reviewed literature from Section 2.1 about requirements for innovative thinking was compared and discussed with the analyzed data from Chapter 4 to examine the effects of UIC on innovative thinking of students.

First of all, it was discussed that students might already be innovative thinkers when they start an education program about innovation. However, the program still helps to build their innovative thinking further if it involves practical units. In addition, it was pointed out that the willingness to innovate is not enough and the ability to innovate has to be built to develop innovative thinking. Programs that connect theory with practical experience or building their own start up help students build their ability to innovate. Nevertheless, there was agreement that it depends on how supportive the company is and how the project is set up for students to develop innovative thinking. In addition, there was agreement that the awareness on how something can be improved is important for innovation capability, but also the awareness of aspects that could lead to difficulties and students can build this awareness by collaborating with industry. In the literature the importance of creative thinking for being innovative was emphasized. There was some disagreement between interviewees if students practice this enough during real-life projects or if they need creative thinking courses. However, the interviewees agreed that a master program that combines theory and UIC will help students to build creative thinking, which in turn helps to develop innovative thinking. Another way for developing creative thinking for students is to found their own start up.

Overall, the discussion showed that developing innovative thinking is a learning process. There was agreement that innovative thinking can be taught and learned and that UIC can be used for that because developing innovative thinking requires not only theory, but also practical insights and a lot of practice to develop it for the students. Collaboration between industry and students is a good opportunity for that. Moreover, interviewees argued that it is important for innovative thinking to not only solve problems, but also to identify them. Furthermore, innovators require a way of thinking that aims at the realization of opportunity, which students already seem to have to some extent and collaboration gives them the opportunity to develop it further. Innovative thinking is also about breaking frames and to question everything. Students not only question what companies take for granted, but the collaboration with companies also leads students to question what they take for granted.

6. Conclusion

In addition, the importance of leadership and culture for innovation in general was pointed out in the reviewed literature. Nevertheless, culture and leadership were not mentioned as influencing factors in Section 2.3.4. However, there was agreement among the interviewees in Chapter 4 that culture and leadership are very important for a successful collaboration between industry and students. Therefore, future research on UIC could have a closer look.

To put it in a nutshell, the research project showed that UIC creates value for university, students, and industry. There were some similarities between the value investigated in the literature and the interview data, but the analysis also showed that especially the value created for students and industry changes when investigating the collaboration between industry and students. For students, there is more value created and also industry can benefit from additional value created. Furthermore, industry student collaboration has a positive effect on innovative thinking among students. What effects exactly were summarized before. A short summary is that the research project showed that innovative thinking can be learned, and industry student collaboration can help to develop it. When looking at the requirements to innovative thinking listed in the reviewed literature and comparing it to the interview results, one can see that industry student collaboration fulfills these requirements or interviewees argued why some assumptions mentioned in the literature are not accurate. Moreover, participating in an education program that combines theory and practical experience or founding a student start-up can be used to develop innovative thinking

6.2. Theoretical implications

As mentioned before, the literature on the collaboration between industry and students is still scarce. This research project filled this gap to some extent and offered interesting aspects for future research to investigate further. The research project provided information about the value created for university, students, and industry when industry and students collaborate compared to the value created by traditional UIC between industry and researchers. Moreover, the research project examined the effect of UIC on innovative thinking among students and therefore added to current research about UIC. Furthermore, the influencing factors of a collaboration between industry and students were explored to support a successful course of the collaboration. In addition, the role of a facilitator was examined more closely, and the collected data complemented the existing literature about facilitators.

All in all, the theoretical contribution of this research project consists of a novel conceptual framework that was first derived from the research questions and the reviewed literature. In a second step, it was further developed to conceptualize the findings of the research project. The conceptual framework not only shows the value created by traditional UIC, but also the value created by the collaboration between industry and students, which was identified due to the research project. Furthermore, the framework depicts the effect of industry student collaboration on innovative thinking among students, which was identified from the collected data. This framework can be used to guide future research. In addition, it can also be used

to promote collaboration between industry and students and to present it to the university administration and to the management at a company.

6.3. Practical implications

6.3.1. University

Universities should think about offering more master programs like the “Corporate entrepreneurship” master program at Chalmers University, which include a one year innovation project. Otherwise it could be beneficial to offer at least one course per program including a real-life project with a company. Moreover, universities could check how they can facilitate the contact between lecturers or other university employees and industry. University could examine if there is a facilitator like First to Know available and reach out. If not, university could think about other possibilities to put industry and students in contact. If collaboration between industry and students was more established, it could be easier for lecturers to set it up. All in all, based on the research results, it is important for a university to integrate the collaboration into the curriculum to make it fit the learning goals of the courses.

Furthermore, at UCI Beall Applied Innovation students receive a lot of support for founding their own start-up and develop their innovative thinking in the process. It might be beneficial, to offer some supporting services for that at a university in Sweden. For example, like the innovation office at Chalmers University does. It could be interesting to see if they can use an external partner for that like First to Know, for example.

6.3.2. Students

The research project showed that innovative thinking is a learning process. If students are interested in becoming an innovator, they could look for study programs including real-life projects to connect theory with practice and to develop their innovative thinking. Furthermore, students could consider developing their own start-up. Even if it is not successful, they gain valuable experience during the process and develop their innovative thinking.

6.3.3. Industry

Companies should not only focus on collaborating with researchers, but also with students, because they can contribute to a company’s innovation capability. When collaborating with students, they should be open to students’ ideas and let them work on it to let them develop their innovative thinking and so that they can provide the company with innovative insights.

6.3.4. First to Know

First of all, it became clear that First to Know’s ambition to connect the public, private sector and university is appreciated. Furthermore, the interviewees praised First to Know’s possibilities

6. Conclusion

to enable interdisciplinary collaboration and to take a mediating role. They also give the students responsibility when collaborating. Nevertheless, there are also some implications for First to Know to consider. The interviewees made clear that First to Know should be more structured or communicate clearly that it will be unstructured. Furthermore, several interviewees recommended to find a focus and communicate offer and value clearly.

6.4. Limitations

This research project might be limited regarding the generalizability of the research results collected in California. Interviews were conducted at the University of California, Irvine and companies from the Bay area in San Francisco, which are both known for their innovativeness. Hence, the results cannot be generalized to the rest of the USA. Furthermore, the interviews conducted in Sweden are limited to universities, students and companies located in Gothenburg, Sweden and results maybe cannot not be generalized to the rest of Sweden. Furthermore, most of the interviewees from industry in Sweden have a business management background. Therefore, the generalizability of the results to other disciplines might be limited. Nevertheless, the research project produced interesting insights, which can be investigated in future research.

Furthermore, the interviewed university and industry representatives have all worked together with First to Know in the past. Therefore, there might have been a bias to a favorable attitude towards UIC in general. Nevertheless, given the limited timeline, it had to be made sure that the interviewees knew something and have experience with UIC. Nevertheless, the interviewees were also critical and not blindly optimistic. In future research, it might be possible to investigate the obstacles and reluctance to collaborate with students. Moreover, the findings about First to Know and their work as facilitator or mediator cannot be generalized because it is one case. However, the findings from this research project, can be used as guidelines.

6.5. Future research

Throughout the research paper a lot of suggestions were made for future research. In Section 5.1.2 value created by UIC for students, not mentioned in the literature, was discussed by interviewees. It could be interesting for future research to investigate these aspects further since the topic of UIC with a focus on students is not that well explored yet as stated before. Same applies for the value created for industry discussed in Section 5.1.3. It became clear that researchers in the area of UIC have started to think about the value that collaboration between industry and students could create, but it still seems superficial compared to the information uncovered by the interview data. Therefore, future research should focus on industry student collaboration in more depth. In addition, it could be interesting to design a quantitative research project to test if the “new” uncovered aspects of value created by collaboration between industry and student and the “new” influencing factors are valid across a larger data set in Sweden and the USA. Furthermore, with a larger data set it could become possible to rank the identified value creating and influencing factors.

Bibliography

- Ankrah, S. and Al-Tabbaa, O. (2015). “Universities-industry collaboration: A systematic review”. In: *Scandinavian Journal Of Management* 31.3, pp. 387–408.
- Appel - Meulenbroek, H., de Vries, B., and Weggeman, M. (2014). “Layout mechanisms that stimulate innovative behaviour of employees”. In: *Proceedings of the 13th EuroFM Research Symposium* (Berlin, Germany), pp. 5–17.
- Assenza, P. and Western, C. (2017). “Inspiring innovation and creativity: An example of effectuation in the entrepreneurial classroom”. In: *Global Journal of Entrepreneurship Volume* 1.1, pp. 43–56.
- Baregheh, A., Rowley, J., and Sambrook, S. (2009). “Towards a multidisciplinary definition of innovation”. In: *Management Decision* 47.8, pp. 1323–1339.
- Barnes, T., Pashby, I., and Gibbons, A. (2002). “Effective university–industry interaction:: A multi-case evaluation of collaborative r&d projects”. In: *European Management Journal* 20.3, pp. 272–285.
- Becker, B. A. and Eube, C. (2018). “Open innovation concept: Integrating universities and business in digital age”. In: *Journal of Open Innovation: Technology, Market, and Complexity* 4.1, pp. 1–16.
- Bekkers, R. and Freitas, I. M. B. (2008). “Analysing knowledge transfer channels between universities and industry: To what degree do sectors also matter?” In: *Research policy* 37.10, pp. 1837–1853.
- Bell, E., Bryman, A., and Harley, B. (2011). *Business research methods*. Oxford university press.
- (2018). *Business research methods*. Oxford university press, pp. 518–521.
- Birdi, K., Leach, D., and Magadley, W. (2016). “The relationship of individual capabilities and environmental support with different facets of designers’ innovative behavior”. In: *Journal of Product Innovation Management* 33.1, pp. 19–35.
- Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., and Palincsar, A. (1991). “Motivating project-based learning: Sustaining the doing, supporting the learning”. In: *Educational psychologist* 26.3-4, pp. 369–398.
- Bonaccorsi, A. and Piccaluga, A. (1994). “A theoretical framework for the evaluation of university-industry relationships”. In: *R&D Management* 24.3, pp. 229–247.
- Boudreau, K. J. and Lakhani, K. R. (2013). “Using the crowd as an innovation partner.” In: *Harvard business review* 91.4, pp. 60–9.
- Bozeman, B. and Gaughan, M. (2007). “Impacts of grants and contracts on academic researchers’ interactions with industry”. In: *Research policy* 36.5, pp. 694–707.

Bibliography

- Bstieler, L. (2006). "Trust formation in collaborative new product development". In: *Journal of Product Innovation Management* 23.1, pp. 56–72.
- Caldwell, D. F. and O'Reilly, C. A. (1982). "Boundary spanning and individual performance: The impact of self-monitoring." In: *Journal of Applied Psychology* 67.1, pp. 124–127.
- Chen, A., Li, L., Li, X., Zhang, J., and Dong, L. (2013). "Study on innovation capability of college students based on extenics and theory of creativity". In: *Procedia Computer Science* 17, pp. 1194–1201.
- Chesbrough, H. W. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business Press.
- Cummings, S. and Bridgman, T. (2016). "The limits and possibilities of history: How a wider, deeper, and more engaged understanding of business history can foster innovative thinking". In: *Academy of Management Learning & Education* 15.2, pp. 250–267.
- D'Este, P., Guy, F., and Iammarino, S. (2013). "Shaping the formation of university–industry research collaborations: what type of proximity does really matter?" In: *Journal of economic geography* 13.4, pp. 537–558.
- D'Este, P. and Patel, P. (2007). "University–industry linkages in the UK: What are the factors underlying the variety of interactions with industry?" In: *Research policy* 36.9, pp. 1295–1313.
- Dagar, V. and Yadav, A. (2016). "Constructivism: A paradigm for teaching and learning". In: *Arts and Social Sciences Journal* 7.4.
- Dooley, L. and Kirk, D. (2007). "University-industry collaboration: Grafting the entrepreneurial paradigm onto academic structures". In: *European Journal of Innovation Management* 10.3, pp. 316–332.
- Drucker, P. F. (2002). "The discipline of innovation". In: *Harvard business review* 80, pp. 95–104.
- Dym, C. L., Agogino, A. M., Eris, O., Frey, D. D., and Leifer, L. J. (2005). "Engineering design thinking, teaching, and learning". In: *Journal of engineering education* 94.1, pp. 103–120.
- Elenkov, D. S. and Manev, I. M. (2005). "Top management leadership and influence on innovation: The role of sociocultural context". In: *Journal of management* 31.3, pp. 381–402.
- Etzkowitz, H. and Leydesdorff, L. (2000). "The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations". In: *Research policy* 29.2, pp. 109–123.
- Etzkowitz, H., Webster, A., Gebhardt, C., and Cantisano-Terra, B. R. (2000). "The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm". In: *Research policy* 29.2, pp. 313–330.
- Franco, P. F. and DeLuca, D. A. (2019). "Learning through action: Creating and implementing a strategy game to foster innovative thinking in higher education". In: *Simulation & Gaming* 50.1, pp. 23–43.
- Fusfeld, H. I. (1995). "New global sources of industrial research". In: *Technology in Society* 17.3, pp. 263–277.

Bibliography

- George, G., Zahra, S. A., and Wood, D. R. (2002). "The effects of business–university alliances on innovative output and financial performance: a study of publicly traded biotechnology companies". In: *Journal of business Venturing* 17.6, pp. 577–609.
- Giuliani, E., Morrison, A., Pietrobelli, C., and Rabbellotti, R. (2010). "Who are the researchers that are collaborating with industry? An analysis of the wine sectors in Chile, South Africa and Italy". In: *Research Policy* 39.6, pp. 748–761.
- Guba, E. G., Lincoln, Y. S., et al. (1994). "Competing paradigms in qualitative research". In: *Handbook of qualitative research* 2.163-194, pp. 105–117.
- Gupta, S. (2011). "Constructivism as a paradigm for teaching and learning". In: *International Journal of Physical and Social Sciences* 1.1, pp. 23–47.
- Haeussler, C. and Colyvas, J. A. (2011). "Breaking the ivory tower: Academic entrepreneurship in the life sciences in UK and Germany". In: *Research Policy* 40.1, pp. 41–54.
- Hagen, R. (2002). "Globalization, university transformation and economic regeneration: a UK case study of public/private sector partnership". In: *International Journal of Public Sector Management* 15.3, pp. 204–218.
- Hill, L. A., Brandeau, G., Truelove, E., and Lineback, K. (2014). "Collective genius: no longer casting themselves as solo visionaries, smart leaders are rewriting the rules of innovation". In: *Harvard Business Review* 92.6, p. 94.
- Huhtelin, M. and Nenonen, S. (2015). "A Co-creation Centre for university–industry collaboration–a framework for concept development". In: *Procedia Economics and Finance* 21, pp. 137–145.
- Jacob, M., Hellström, T., Adler, N., and Norrgren, F. (2000). "From sponsorship to partnership in academy-industry relations". In: *R&D Management* 30.3, pp. 255–262.
- Jones, M. and Burgess, L. (2010). "Encouraging SME eCollaboration–the role of the champion facilitator". In: *Interdisciplinary Journal of E-Learning and Learning Objects* 6.1, pp. 137–151.
- Kim, M.-K., Park, J.-H., and Paik, J.-H. (2018). "Factors influencing innovation capability of small and medium-sized enterprises in Korean manufacturing sector: facilitators, barriers and moderators". In: *International Journal of Technology Management* 76.3-4, pp. 214–235.
- Kolb, D. (1984). "Experience as the source of learning and development prentice-hall". In: *Englewood Cliffs*, pp. 31–61.
- Kristensen, T. (2004). "The physical context of creativity". In: *Creativity and innovation management* 13.2, pp. 89–96.
- LeCompte, M. D. and Goetz, J. P. (1982). "Problems of reliability and validity in ethnographic research". In: *Review of educational research* 52.1, pp. 31–60.
- Lee, J. and Win, H. N. (2004). "Technology transfer between university research centers and industry in Singapore". In: *Technovation* 24.5, pp. 433–442.
- Lee, Y. S. (2000). "The sustainability of university-industry research collaboration: An empirical assessment". In: *The journal of technology transfer* 25.2, pp. 111–133.
- Lincoln, Y. S. and Guba, E. G. (1985). "Establishing trustworthiness". In: *Naturalistic inquiry* 289.331, pp. 289–327.

Bibliography

- Link, A. N., Siegel, D. S., and Bozeman, B. (2007). “An empirical analysis of the propensity of academics to engage in informal university technology transfer”. In: *Industrial and Corporate Change* 16.4, pp. 641–655.
- Lundvall, B.-Å. (2007). “National innovation systems—analytical concept and development tool”. In: *Industry and innovation* 14.1, pp. 95–119.
- Meredith, S. and Burkle, M. (2008). “Building bridges between university and industry: theory and practice”. In: *Education + Training* 50.3, pp. 199–215.
- Merx-Chermin, M. and Nijhof, W. J. (2005). “Factors influencing knowledge creation and innovation in an organisation”. In: *Journal of European Industrial Training* 29.2, pp. 135–147.
- Meyer-Krahmer, F. and Schmoch, U. (1998). “Science-based technologies: university–industry interactions in four fields”. In: *Research policy* 27.8, pp. 835–851.
- Nakagawa, K., Takata, M., Kato, K., Matsuyuki, T., and Matsushashi, T. (2017). “A university–industry collaborative entrepreneurship education program as a trading zone: the case of Osaka university”. In: *Technology Innovation Management Review* 7.6, pp. 38–49.
- Ness, R. B. (2015). “Promoting innovative thinking”. In: *American journal of public health* 105.1, pp. 114–118.
- Nonaka, I. and Konno, N. (1998). “The concept of “Ba”: Building a foundation for knowledge creation”. In: *California management review* 40.3, pp. 40–54.
- Nonaka, I. and Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford university press, p. 23.
- Ollila, S. and Williams-Middleton, K. (2011). “The venture creation approach: integrating entrepreneurial education and incubation at the university”. In: *International Journal of Entrepreneurship and Innovation Management* 13.2, pp. 161–178.
- Oort, F. G. van, Burger, M., and Raspe, O. (2008). “Inter-firm relations and economic clustering in the Dutch Randstad region”. In: *The Economics of Regional Clusters: Networks, Technology and Policy*. Ed. by U. Blien and G. Maier. Edward Elgar Publishing, pp. 145–165.
- Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D’Este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., et al. (2013). “Academic engagement and commercialisation: A review of the literature on university–industry relations”. In: *Research policy* 42.2, pp. 423–442.
- Perkmann, M. and Walsh, K. (2007). “University–industry relationships and open innovation: Towards a research agenda”. In: *International journal of management reviews* 9.4, pp. 259–280.
- Ponomariov, B. L. (2008). “Effects of university characteristics on scientists’ interactions with the private sector: An exploratory assessment”. In: *The Journal of Technology Transfer* 33.5, pp. 485–503.
- Ring, P. S. and Van de Ven, A. H. (1994). “Developmental processes of cooperative interorganizational relationships”. In: *Academy of management review* 19.1, pp. 90–118.
- Salter, A. J. and Martin, B. R. (2001). “The economic benefits of publicly funded basic research: a critical review”. In: *Research policy* 30.3, pp. 509–532.

Bibliography

- Santoro, M. D. and Betts, S. C. (2002). "Making industry—university partnerships work". In: *Research-Technology Management* 45.3, pp. 42–46.
- Santoro, M. D. and Chakrabarti, A. K. (2001). "Corporate strategic objectives for establishing relationships with university research centers". In: *IEEE Transactions on Engineering Management* 48.2, pp. 157–163.
- Schwab, K. (2020). *The Global Competitiveness Report 2017-2018*. URL: http://reports.weforum.org/global-competitiveness-index-2017-2018/?doing_wp_cron=1589274302.7119181156158447265625#topic=data (visited on 07/06/2020).
- Sherwood, A. L., Butts, S. B., and Kacar, S. (2004). "Partnering for knowledge: A learning framework for university-industry collaboration". In: *Midwest Academy of Management, 2004 Annual Meeting*, pp. 1–17.
- Siegel, D. S., Waldman, D. A., Atwater, L. E., and Link, A. N. (2004). "Toward a model of the effective transfer of scientific knowledge from academicians to practitioners: qualitative evidence from the commercialization of university technologies". In: *Journal of engineering and technology management* 21.1-2, pp. 115–142.
- Siegel, D. S., Waldman, D., and Link, A. (2003). "Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study". In: *Research policy* 32.1, pp. 27–48.
- Starbuck, E. (2001). "Optimizing university research collaborations". In: *Research-Technology Management* 44.1, pp. 40–44.
- Suddaby, R. (2006). "From the Editors: What Grounded Theory Is Not". In: *The Academy of Management Journal* 49.4, pp. 633–642.
- Thompson, V. A. (1965). "Bureaucracy and innovation". In: *Administrative science quarterly* 10.1, pp. 1–20.
- Torre, A. and Rallet, A. (2005). "Proximity and localization". In: *Regional studies* 39.1, pp. 47–59.
- University Industry Innovation Network (2020). *University-Industry Interaction Conference*. URL: <https://www.university-industry.com/> (visited on 07/06/2020).
- Viale, R. and Etzkowitz, H., eds. (2010). *The Capitalization of Knowledge*. Books. Edward Elgar Publishing, p. 83.
- Yin, R. K. (2011). *Qualitative research from start to finish*. Guilford publications, pp. 7–8.

A. Appendix: Organizational forms of UIC

Table A.1.: Organizational forms of UIC

Personal Informal Relationships	<ul style="list-style-type: none"> – Academic spin-offs – Individual consultancy (paid for or free) – Information exchange forums – Collegial interchange, conference, and publications – <i>Joint or individual lectures</i> – <i>Personal contact with university academic staff or industrial staff</i> – <i>Co-locational arrangement</i>
Personal Formal Relationships	<ul style="list-style-type: none"> – Student internships and sandwich courses – <i>Students' involvement in industrial projects</i> – Scholarships, Studentships, Fellowships and postgraduate linkages – <i>Joint supervision of PhDs and Masters theses</i> – Exchange programmes (e.g. secondment) – Sabbaticals periods for professors – <i>Hiring of graduate students</i> – <i>Employment of relevant scientists by industry</i> – <i>Use of university or industrial facility (e.g., lab, database, etc.)</i>
Third Party	<ul style="list-style-type: none"> – Institutional consultancy (university companies including Faculty Consulting) – Liaison offices (in universities or industry) – <i>General Assistance Units (including technology transfer organizations)</i> – Government Agencies (including regional technology transfer networks) – Industrial associations (functioning as brokers) – <i>Technological Brokerage Companies</i>
Formal Targeted Agreements	<ul style="list-style-type: none"> – Contract research (including technical services contract) – <i>Patenting and Licensing Agreements (licensing of intellectual property rights)</i> – Cooperative research projects – <i>Equity holding in companies by universities or faculty members</i> – Exchange of research materials or Joint curriculum development: – <i>Joint research programmes (including Joint venture research project with a university as a research partner or Joint venture research project with a university as a subcontractor)</i> – Training Programmes for employees
Formal Non-Targeted Agreements	<ul style="list-style-type: none"> – Broad agreements for U-I collaborations – <i>Endowed Chairs and Advisory Boards</i> – <i>Funding of university posts</i> – <i>Industrially sponsored R&D in university departments</i> – Research grant, gifts, endowment, trusts donations (financial or equipment), general or directed to specific departments or academics
Focused Structures	<ul style="list-style-type: none"> – Association contracts – Innovation/incubation centers – Research, science and technology parks – University–Industry Consortia – University–Industry research cooperative research centers – <i>Subsidiary ownerships</i> – Mergers

The *italic* indicates new organizational forms as identified from the review.

B. Appendix: Summary literature review

Table B.1.: Summary Literature Review

Innovative thinking

Definition innovation

- integrative definition of innovation: "Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace." (Baregheh, Rowley, and Sambrook, 2009, p. 1334) → for different disciplines, shared understanding of innovation

Definition innovative thinking

- conscious, purposeful search for opportunities to innovate → systematic practice of innovation (Drucker, 2002)
- way of thinking that aims at the realization of opportunity (Nakagawa et al., 2017); innovative thinking means breaking frames (Ness, 2015)
- willingness to innovate not enough → build ability to innovate (Hill et al., 2014)

Influencing factors

- critical thinking and problem solving skills relevant (Dagar and Yadav, 2016; Franco and DeLuca, 2019) → training (Birdi, Leach, and Magadley, 2016; Chen et al., 2013; Franco and DeLuca, 2019)
 - diversity (Cummings and Bridgman, 2016)
 - culture, organizational climate and leadership (Elenkov and Manev, 2005; Hill et al., 2014; Kim, Park, and Paik, 2018; Merx-Chermin and Nijhof, 2005)
-

University-industry collaboration

Definition UIC

- university, industry and government → triple helix (Etzkowitz and Leydesdorff, 2000)
- cooperation university, industry to promote knowledge and technology exchange (Bekkers and Freitas, 2008; Siegel, D. Waldman, and A. Link, 2003)
- bidirectional exchange of knowledge (Ankrah and Al-Tabbaa, 2015; Jacob et al., 2000)

Types of UIC

- rational or irrational process (Ankrah and Al-Tabbaa, 2015)
- most relevant types for this research project: "Personal Formal Relationships" and "Focused Structures" (see App. Tab. A.1) (Ankrah and Al-Tabbaa, 2015; Bonaccorsi and Piccaluga, 1994)
- analytical framework "trading zone" for UIC education program Figure (see Fig. 2.4) (Nakagawa et al., 2017)

Value created by UIC

Value generated for universities

- public and private funding (Ankrah and Al-Tabbaa, 2015; Barnes, Pashby, and Gibbons, 2002; Hagen, 2002)
- creation business opportunities; further income through licenses and patents created by UIC (Ankrah and Al-Tabbaa, 2015; Meyer-Krahmer and Schmoch, 1998)
- knowledge exchange, collaborative research preferred over contract research (Meyer-Krahmer and Schmoch, 1998; Siegel, D. A. Waldman, et al., 2004)
- joint publications, enhanced reputation, providing real-life experience, internships, employment opportunities (Ankrah and Al-Tabbaa, 2015; Becker and Eube, 2018; Santoro and Chakrabarti, 2001)

B. Appendix: Summary literature review

Value generated for students

- project-based learning, practical insights, new ideas → better training and employment opportunities (Ankrah and Al-Tabbaa, 2015; Blumenfeld et al., 1991; J. Lee and Win, 2004; Santoro and Betts, 2002)
- improve business and external collaboration skills (Blumenfeld et al., 1991)
- richer learning process (J. Lee and Win, 2004; Meredith and Burkle, 2008; Starbuck, 2001)

Value generated for companies

- increased innovation capacity (Ankrah and Al-Tabbaa, 2015; George, Zahra, and Wood, 2002; Viale and Etzkowitz, 2010, p.83) → complementary expertise, knowledge and resources (Starbuck, 2001); improved in-house R&D (Ankrah and Al-Tabbaa, 2015; Barnes, Pashby, and Gibbons, 2002); keeping up with change and technological developments (Ankrah and Al-Tabbaa, 2015)
- enthusiastic/ critical students → fresh perspective, improved morale, motivation employees, hiring opportunity (Ankrah and Al-Tabbaa, 2015; Jacob et al., 2000; J. Lee and Win, 2004; Nakagawa et al., 2017; Salter and Martin, 2001)
- more control; ensure applicability of academic research (Fusfeld, 1995; Jacob et al., 2000; Y. S. Lee, 2000)
- access to university's research network (Ankrah and Al-Tabbaa, 2015; George, Zahra, and Wood, 2002).

Influencing factors

- how the UIC is set up; multidisciplinary environment; individual characteristics; quality level & reputation academic institution; accompanying services

C. Appendix: Nvivo codes overview

Thematic analysis overview from “Nvivo” (“Nvivo” file available upon request)

Aggregated Themes
Themes
Codes

Creation UIC
Argue why it is useful to spend money on UIC
Companies pay a fee to be part of the program to ensure that they take it seriously and are committed
Corporate advisory board with alumni to help develop program and education
Networking to create UIC
Innovation advisor network grows through word of mouth
Networking very important
UIC is established through personal contacts, important to have a network
UIC driven by individuals
Graduates go into industry and can put the company and the former professor in touch to create UIC
Innovation advisor network is individual driven, not really company driven
Professors or lecturers have to take the initiative and start doing projects with industry
Willingness very important for success of UIC, often just one on one relationships that drive UIC, individuals to a large extent
Effects of UIC on innovative thinking
Diversity
Diverse thought one of the values at Autodesk, if too many people from Bay area you do not have the benefit of having diverse thinkers from all over the world
Diversity important for innovation
Idea creation
Autodesk has different programs with interns, there are some things Autodesk wants to approach and problem space more or less fixed for interns and some programs with more freedom
Castellum Students can work on ideas from manager that are not finished yet, not as finished that employees can work on it or a consultant
Does not tell students what to do exactly, wants them to come up with proposals, has his own idea and then they discuss to find the best solution, otherwise people become passive and solution might not be the best as well
Either companies give predefined challenges, questions or are completely open to suggestions, depends on the respective student if they can handle it to have no structure
Either the students' own interests get them started or they discover something during projects
Guiding students' projects to ensure that there will be an actual result
Not completely new but creative, simplifying ideas during project
Student workers do more incremental innovation, if it is radical, they stay at the university lab
Students also have radical ideas
Students are supposed to pursue sth that is innovative, sth new for the company
Students come up with their own ideas and supervisor at company discusses it with them to develop the idea further
Students come up with their own ideas e.g. for master theses
Students have both incremental and radical innovation ideas

C. Appendix: Nvivo codes overview

	Students need some time to understand how everything works, procedures, processes, so ideas become better over time
	Students bring in hands on topics and really good ideas
	University wanted students to pursue sth radical, sth that might be relevant in a couple of years, students wanted to create sth that could be implemented in 1 year, their idea was still too radical for Volvo Penta
	Innovation communities with universities and companies working together on open innovation
	Learning how to be innovative
	Courses about entrepreneurship and group work with people with different backgrounds help to learn about entrepreneurship and are a good preparation for the real world
	Depends on the person if they take the chance and express ideas when collaborating, sometimes shy, expressed ideas usually very good, refreshing for company
	Design students learn to question a lot and to make sure to get to the bottom of problem not just a symptom
	Educational systems, universities need to reflect on what they need to provide to students to nurture innovative thinking
	Fail fast forward, learn what failure was and continue, try new things, not doing anything worse than failure
	If theory and practice combined, you can learn innovative thinking
	Innovation students already interested in innovation from the start and build their innovative thinking further through program, get tools, have discussions with people working with innovation and the company
	Innovative is about how you approach problems, difficult for students to reinvent the wheel, but they can question existing processes and procedures that have been in place for a while
	Innovative mindset can be built, important that your manager supports you
	Innovative thinking is a learning process, innovation hard work, think outside the box, challenge things, also about making choices and how to deal with failure
	Innovative thinking is developed by projects with companies
	Innovative thinking, mindset is something you have, you bring it with you, either they have potential or not
	It depends on how open the company is and how the project is for students to develop innovative thinking
	It does not matter how much experience you have; it is about the desire to do great things
	Master program developed students' innovative thinking because they got all the tools in the first year and could apply it for the project in the 2nd year
	Most students innovative but you have to dare to be innovative, maybe about personalities, some people might not even be innovative when collaborating with a company, collaboration opportunity to explore that side of yourself
	People that get into S & B are from around there, grew up with whole tech business world or people that were always different and innovative or you get in and you start being this way or you go there because you like idea of innovation, doing new things
	Project builds students' innovative thinking, start to think for yourself and to try out things, good way of learning
	Research fellow at the research translation group, looking at the different ideas and initiatives opens the mind
	Students develop innovative thinking during practice-oriented master programs, but these programs might attract more innovative people from the start
	Students develop innovative thinking while collaborating with companies, people that are very innovative before might just start their own start up right away

C. Appendix: Nvivo codes overview

	Students have an idea what innovative thinking is but working with companies they learn more and learn how important trust is for innovation
	Students need real projects to build their innovative thinking, only conducting interviews is not enough
	Students say that the applied innovation programs really helped them, educational experience very valuable, even if they do not continue it gives them the experience necessary for their professional career
	Students that apply to the UCI programs usually have already an idea, are more innovative than the others, more entrepreneurial spirit, then the programs help them to develop it further
	Students would have needed creative thinking courses to be more innovative during the projects, unusual does not mean innovative
	the differentiator for innovation is the mindset
	UCI programs try to develop students that are already innovative, already have their own ideas or experiences and other students that want to start to learn about innovation and entrepreneurship
	UCI tries to help its student to develop an innovative and entrepreneurial mindset, not just about the hard skills but it is also a soft skill learning process
	When doing real life innovation projects students get to know other entrepreneurs and the exchange with these people also shapes your innovative thinking
	young people think more like the innovation genome like older people, life changes you
	Learnings from real life projects
	Crucial to have real life projects because projects actually have an impact, students are treated as employees, because it is real students very engaged, feel uncertainty, get to know the political challenges, had to find their own project and promote it
	Important for students to have a real-life project because hard for uni to simulate the real world, so many factors that influence project that you do not learn about in school
	Interns very innovative from the start, come in with very good ideas or just need a little bit of nurturing, but through the internship they learn how to make an idea happen at a large company like Autodesk, how does it serve the business, convince management
	It is good for students to be pushed out of their comfort zone, important for innovative thinking
	Projects with industry without clear task help students to reflect afterwards, reflected behavior is an important part of innovations
	Real life experience helps students to calibrate their expectations, you cannot just be radical but you also have to find sth that is innovative but in line with company strategy or core capabilities and internal politics have to be considered
	Real life projects give students the necessary knowledge and way of thinking that are necessary for becoming an entrepreneur
	Students get real life experience and lose false expectations
	Students get to know the different perspectives of academia, industry, their own and how to bring them together
	Students learn a lot of interesting and different things, learn faster than in school because they do task that normal employees would do but do not have the time for that
	Students learn that politics have a big impact on projects
	Students learn to deal with organizational politics
	Students need to learn how to deal with situations where the question is not clear yet, figure out what the context is, get to know different perspectives, ask questions, important parts of innovative thinking
	Students have to experience how it is to run an innovation project, you cannot really prepare students

C. Appendix: Nvivo codes overview

	Students learn how to deal with uncertainties
	UCI leads students to question things and questioning is an important part of innovative thinking
	Student start ups
	As a business student it makes sense to found your own business
	Chalmers innovation office to promote student entrepreneurship
	Chalmers ventures to commercialize ideas and to turn it into companies
	Even if students fail with their startup, they learn a lot from it and improve for next time
	Even if start up fails acquired a very attractive skillset for employers, wealth of experience
	Everyone starts with the product idea, but they need help with marketing for example, especially if they are engineering students
	Innovation advisors can help startups with specific questions about marketing business development or technical assistance
	Innovation advisors can help student startups, mentor them, might even collaborate on a continuing basis or just a spot question to get the advisor's insights
	Innovation advisors can help young entrepreneurs to get a real-world perspective, but just to some extent depending on the ultimate target market
	innovation advisors help them to learn a lot so that they are prepared when they get out of school to have a better chance at success with the next start up because they have learned so much
	Most startups that got funded need the support, but do not become anything but the experience of going through the process very educational for the students
	Researchers and students from the master program can team up to develop the idea further
	Sometimes innovation advisor finds a student and an interesting idea and takes a more active role and they can collaborate to both parties benefits without taking advantage of the students
	Students start up fund because they saw a need for it, teach entrepreneurship and innovation among students and this is something necessary in order to support those students
	Student startups have interns during the summer to build the company further, a lot of UCI students on campus interested in joining startups
	Students build start up on the side, also attending classes, do not get credit, special people with a lot of drive from which they can benefit in the long run,
	Students can get involved in a researcher's commercialization attempt and support him while learning more and improving their skillset
	Students found their own start up trying to link students and workplace, partnered with Deloitte to train students, students got to practice their knowledge and Deloitte could hire them
	Students get their inspiration for a start up from experiences they have had, trying to solve a problem for themselves mostly
	UCI applied innovation great place for people with ideas that they actually want to pursue
	UCI Beall applied innovation promotes entrepreneurship and innovation, they teach you how to find your own start up, no idea how businesses work and how to raise funds for example
	UCI Programs to teach students the different skills or knowledge that they need for their start up
	UCI Student start up fund to support students that want to start their own business
	UCI tries to create a nurturing eco system with the UCI research park, other accelerators or incubators for the businesses that make it to the next level, some speaker series, but no direct connections to companies

C. Appendix: Nvivo codes overview

	Very useful to start your own company as students to apply your knowledge, did not have any prior experience
	Students challenge both academia and industry, best interface to challenge both of them
	Theory and practical insights
	Apply theory in practice, learn a lot, develop a trial, and error mindset, good opportunity to practice a lot, getting better at sth you practice
	Applying theory in practical settings and comparing it, comparing practical insights to what theory says accelerates learning and development
	Biggest take away from master was the learning that you are not able to create sth new before you get to know the user and their pain points, really understand problem etc.
	UCI approach to entrepreneurship
	Students do not get credit for UCI applied innovation programs
	UCI applied innovation has different programs, to help students find ideas and then also when the ideas are more concrete to develop them further, help them find their way and also to get funding
	UCI offers fellowships for grad students interested in the business world, help with research translation group or to make connections for UCI with industry
	UCI tries to achieve that students get credit for the innovation programs, otherwise students too focused on their other courses
	Influencing factors of UIC
	Company size
	Bigger companies have more resources (money and time) to work with students
	Bigger companies have the resources and might try to publish an article with a student or do it for publicity
	It is easier to negotiate agreements with smaller companies or startups, easier going about the contracts
	Smaller companies need students' work and insights more, rely on it more because they have less resources than larger companies
	Smaller companies not only open to implementing students' ideas but might also co-implement
	Smaller or medium sized companies might be more open, higher chance to get innovative thinking, larger companies follow their processes, routines
	Startups no money to pay someone from the outside so students' good opportunity to gain knowledge and expertise
	Students do very cool work, but nobody does anything with it, nobody incentive to make it happen, any large company rejects at first anything that changes things
	Students get real life experience no matter the company size, large company processes more complex, students should decide what interests them more
	The larger the company the longer it takes to implement things
	Volvo large company, difficult to have decisions made, to have budget, difficult to get overview over whole org and relevant people for project, challenges of driving innovation in a large company, try out firsthand, frustrating but good learning experience
	Culture
	Bay area special culture, reason why UIC so good there, very fertile soil, yes before no attitude, everything is possible
	Because of Beall applied innovation UCI makes large steps towards working in the speed of business, can be more flexible and nimbler
	Business culture in California that is very special, unlike everything else in the world, globally UIC suboptimal almost all the time, there is more that can be done
	Important to celebrate people who are doing things differently for becoming an innovative organization

C. Appendix: Nvivo codes overview

	It seems like there is no difference between the startup ecosystem and Stanford, seems like the same thing, and research don at Stanford and Berkeley cutting edge but also considers the real world
	Trust and openness very important for innovation, open source way of thinking, capability of communicating value
	UIC works differently at S and B, it is not about internship, all people there or their family are involved with startups, you just make a call
	Universities are rather open and about sharing knowledge while companies are more closed and about proprietary information, different cultures, difficult to negotiate agreement
	Culture and leadership most important thing for being innovative, how to colleagues react when you present a new idea, how does boss react when approached with a new idea
	Depends on what or what type of product or service if it makes sense to bring in students, makes more sense for industrial companies than e.g. consultancies, not enough time to try things
	It depends on the academic setting that the lecturer was trained in if he tries to initiate real life experience projects
	Leadership
	Focus, area on what students work
	Depends on the company on how much decision freedom the students have
	If students have the freedom, they develop a whole innovation project on their own, consider the company's situation etc.
	It depends on the company if students have the freedom to propose new ideas or if they should develop already existing ideas
	It depends on the company if the students can bring in their own ideas or have predefined challenges and then it depends on the students if they are able to work without instructions or if they need guidelines
	Management has to be open to new idea, no prestige thinking and thinking that they are smarter
	Students did project for Volvo, innovation in a certain area, that Volvo then could develop further
	Implementation UIC
	Companies expect sth practical from the students that they can implement afterwards
	Depends on the people in charge on how open organizations are towards innovation projects
	Important to have a manger that pushes UIC and has his own budget to finance it
	Industry has to gain from UIC to be interested, has to be worth their time
	Leader should be open, helps if interested in research or is a researcher himself
	Leadership first important step for UIC
	Leadership has to be interested to make UIC possible
	Lecturer makes sure to partner with companies that are open to students' ideas and suggestions
	Manager prepared employees before he brought in interns, also selected carefully where to bring in students, if employee dies not like change not fair for intern to assign intern to that person
	Manager pushed UIC although employees said that no other company is doing sth like that
	You need someone who is really interested in student collaboration and drives it, makes it possible with the budget, if manager not interested it does not even help if CEO is interested in a larger company
	Project course, Implementation ideas, project results
	Company supervisors or managers have to be interested in innovation otherwise project cannot succeed

C. Appendix: Nvivo codes overview

	Depends on the company how engaged they are to implement thesis results e.g. workshops on how to apply findings in company
	Internal politics have a big influence on innovation projects
	It is necessary to have a manager that is really interested in the project and pushes it
	Research and results of master thesis published, provided great insights applicable for business cases
	Students had an impact with their project on corporate entrepreneurship, but difficult to implement if no one responsible, no assigned budget, assigned project leader or a specific timeframe
	Students valuable ideas, but time and budget restrictions and managers have to see value of collaboration
	Students question, when work is challenged, employees often do not like that important to have manager that think it is important
	Volvo did not implement the idea although students left prototype and business case and project well known
	Volvo took project very seriously and opened doors for students, more interested in the process itself than in the end product, but also problem with credibility and not having as much experience than a management consultant
	Trust in capabilities
	Companies hire brilliant people but then they are through orientation they are not going to be as innovative
	If manager trusts employees it inspires them, drives them
	It is about giving employees the opportunity, time, and space to be innovative, be together without a specific goal
	It is important that the manager takes someone seriously no matter the hierarchical differences
	Leaders should be open to feedback, trust people to be smart and bring in different ideas
	Manager should trust people to be smart and come up with good ideas, not just the manger's ideas are good
	Managers should not be afraid of hiring people that are smarter than themselves, hire people with complimentary skill or that are smarter, then do not tell them what to do, let them tell you what to do
	No one should feel like they have to excuse themselves, your ideas as valuable as anyone's idea
	Organizational form
	Depending if it is private or public different criteria and motivation, different idealism levels, different starting points but processes of project similar
	Public companies not such a big pressure to change
	Public sector companies no financial goals, more societal value, different focus for innovation, public organizations also slower in decision making etc.
	Swedish public organizations demand open source
	Proximity
	Different things and companies co located at the cove, goal was to connect students with startups in the business community and to see what is going on etc.
	Proximity is important for establishing UIC and makes it more likely e.g. Volvo and GU, Chalmers
	Some of the companies at UCI research park started on campus, an idea that they commercialized, it is a collaborative environment
	Some students do an internship at the UCI research park, good that companies nearby otherwise not possible timewise

C. Appendix: Nvivo codes overview

	The focus of the university and the sector of the company have to be a fit, e.g. Volvo needs Businesspeople for Handels and engineers from Chalmers, then UIC is interesting
	UCI Applied innovation rents out small spaces to startups or companies at the cove to gather innovative thinkers to have interactions, network building
	Stanford and Berkeley best schools in the world regarding UIC because people know what they are doing, start their own startups, which are very successful, players in Silicon Valley
	Sweden so innovative because close collaboration between university, students, and industry
	Value created for industry
	Access to knowledge
	Autodesk provides products for free for students and educators to prepare them for entering the workforce and to get feedback from them to ensure that Autodesk provides the right content
	Companies want to learn about innovation processes and design from the students
	Companies interested in working with UCI because they have the experts
	Companies value input from students, for students it is easy to put theory into practice, companies' access to latest theory
	Master students have a deep knowledge
	Some companies hire student workers to use their university knowledge, applies knowledge in R&D department
	Students work easily with digitalization, work way faster than normal employees
	Students can teach companies new innovation tools, new approaches e.g. agile working, business model canvas
	Technology keeps changing faster and faster and companies need new perspectives, new mindsets to keep up
	Universities provide networks of connections, knowledge of the latest technology, strive to innovate, develop the mindset of R&D is core of universities
	Branding
	Autodesk has a student ambassador program, are early adopters, are support from other students or educators, students get visibility in industry and Autodesk use program to spin up their features in the educations
	Interns to work on thought leadership and how to brand themselves as a company etc.
	Use student projects for branding, brand image e.g. if company is perceived as old school or stiff e.g. public companies, send message that company is innovative
	Financial aspects
	Companies can use students for the broad analysis of the situation, can skip this step
	It is cheap to let students work on a project for a year that could provide value for the company
	Team of students spending a lot of time thinking about the issue, consultant would cost a lot of money
	Inspiration and energy
	Companies can benefit from students' expertise and knowledge, eagerness to do something good and to learn, companies can also learn from this attitude
	Especially in large companies it is a team that tries to go against the larger culture, extra energy needed
	Interest and energy of students, curiosity, do not have backpacks full of tradition and culture, they ask brand new questions, companies keep answering same questions
	It is good to have a mix of age and diversity, students bring that in
	Loves working with students, gives energy, meeting new people
	Students give company energy and new ideas
	Students help to inspire employees, but employees usually cannot implement ideas right away, also depends on how open person is to be inspired

C. Appendix: Nvivo codes overview

	Students provide company with a high-quality report, get a group of students doing an assessment or analysis, can help to push something
	Students seen as a source of innovation
	Want to collaborate with students because they bring a boost of energy
	Young people inspire, happiness and the wish to accomplish something
	Internships
	Interns have ideas that Autodesk wants to use, fresh insights to come up with new product features, how Autodesk can innovate in the future
	Interns have more time to work on ideas, do not have other responsibilities, not any objectives to hit
	Interns work on very interesting projects; Autodesk takes ideas seriously and also hires them full time to continue working on projects
	Internship is good, but too structured to be able to create sth new, project for 1 year with chance to create sth new better
	Internships are okay, yield a good deal for the student, helps them think but not that beneficial for companies, looks and sounds good but does not really lead up to anything
	Not only mentee profits from mentorship but also mentor if he is open to it, both gain from it
	Question things, fresh perspective, and reflection
	Bringing in students beneficial because as much as new and fresh minds, curiosity, creativity as possible, students have latest tools and methods how to create sth new, but depends on company and its products if it makes sense
	Castellum Company gets great report from students, but also learn a lot from the discussions with the students, increased the manager's knowledge, implemented idea in a similar project
	Important to question things, maybe was right choice 5 years ago but not anymore
	Master thesis students provide valuable input for the company
	Reflective element of student projects, question what why you are doing sth, see if theory can be applied
	Students ask new questions, which leads to new thinking, which is innovation, new questions necessary to have innovative thinking
	Students build a good business case, good arguments that can be presented to higher management
	Students can help companies to be more innovative, develop a strategy for it, or students' new ideas trigger company to do more in that direction
	Students give companies an insight in what is going on, what is new, help managers not to get stuck in old ways, offer new perspective, look at things differently, think in a different way
	Students have a fresh, new perspective, think differently
	Students have different projects, but they still meet to exchange their different experiences to create even more different perspectives
	Students interesting perspective, ask new questions, fresh mindset, probably do not get this from consultancies
	Students like to be innovative, dare to question which leads to progress, disruption in a positive way, students have a lot of that, university teaches students to question and they are still in the curious state of questioning
	Students more freedom to look at problem from different perspectives, suspicious of company
	Students provide new reflections, recommendations based on their thesis, a lot of value if company takes the time to read it and to listen
	Students question a lot, best way to get better, when work is challenged, employees often do not like that

C. Appendix: Nvivo codes overview

	Students spent three days a week at company with an assigned intern and access to the manager, developed an impressive report that inspired the employees
	Students wrote their master thesis about the Autodesk project, analyzed what the team did, tried to figure out what drives people
	Students provide companies with valuable insights, but did not get the chance to implement those insights or to put them into actual results or to corporate change
	Teams should consist of different people to be innovative, different input, young people new perspective
	Very innovative thinking from interns, causes other employees to rethink their work
	Volvo Penta took in students for a year to evaluate which idea to pursue from the 45 ideas from an internal innovation competition
	Work with student's different perspective
	Students important for future
	Autodesk wants to be thought leader in the future of work and making things so need close connection with people in education, early adoption of products and get access to university insights and their research on future of work or other overlooked aspects
	Castellum already thinks about the future when collaborating with students and that the students are going to be leaders in the future, can profit from that then
	Good to work with students to discover what they need to get the right information, it is about utility, not giving them resources that they do not need, valuable information
	If company does sth new today there might be no customers for that yet, but later students' managers or in companies and then the idea is spot on
	Students are the key to understand tomorrow's market and consumers
	Students non-threatening position in company
	Master students provide manager with valuable insights and feedback about project, methods, processes, manager as a person, employees more honest when talking to students than when talking with manager
	Students not scared of telling the truth about what they find, ask questions, do some digging, also students not as close to the project than employees and have another fresh perspective
	Students question things, different point of view, makes it a better company, threat level much lower if question comes from student than from boss
	Students have nothing to lose if innovation project, fails, they can be fearless, can dare to be radical and to challenge the company, to ask questions
	Talent attraction
	Castellum does UIC for talent t attraction, higher company attraction and future sales when students became leaders
	Companies can use projects to get to know students, see if they want to hire someone, brand themselves
	Possibility to get to know people and hire people that have complimentary skill or are even smarter than oneself to learn new things, let them tell you what to do
	Student innovation projects so good that company hires students to stay and implement project
	Student might want to please company to get a job afterwards
	Students should really do the job and do not try to please everyone, much better chance to get a job, have to show their value
	UIC gives great side benefits but the main reason is to attract new talent
	UIC way to find and attract talent
	Value created for students
	At UCI student initiatives or clubs to get in touch with industry, to get experience
	Get to know potential employers

C. Appendix: Nvivo codes overview

	Students can get to know potential employers and show them what they can do
	Through UIC students can get to know companies and discover it is true what they claim, decide if they want to work for them in the future
	In the USA it depends on the field if they do summer internships, if they do one, they learn something new, get to network, have the chance for full-time hire
	Personal development
	Students become more autonomous step by step and can adapt to the increasing responsibility in the projects
	Students learn to stand up to managers and tell them what is wrong, have to learn it because it is difficult, managers used to be right
	The students grow and develop themselves during the projects, they become more self-confident but also open to learn from others
	Student support
	Companies provide students with tutors
	Contacts and connections
	Get the chance to find a mentor
	Innovation advisors can put the students in touch with a lot of different people and companies if they need guidance in a particular area
	UIC provides students with a lot of contacts and connections, they also understand better what they are learning at uni and convert theory to practice
	Sometimes lecturer manages that students work with alumni from the program and get practical experience, a contact, and a mentor in the field they want to work in later on
	University offers students support if needed to ensure project's success, so students in a situation close to reality but still have guidance, not only provide a report but actually had some corporate impact
	Theory and practical insights
	Connect theory and real-life experience, apply and test theory, reflect on it, emotional experience along with theoretical models
	Design academy and technology centers e.g. for students to learn and to dig deeper into their education, work on projects
	Real life projects to test or even develop theory
	The more practical the education, the more ability to apply theories in practice the more the students learn, very good learning experience, better learning outcome
	To some extent the learnings from the master thesis can be used in projects later on
	UIC is not about cheap labor but providing students with opportunities
	UIC leads to real life experience for students
	At university students learn about companies that are very innovative, but the real-life projects show students that this is not the standard company, standard is more conservative, leads to valuable insights
	Education with real life projects prepares students well for their professional careers
	frustrating at first, but valuable experience in hindsight
	Good to get work experience, getting an insight into how things work
	It is not about training rigor academics but rather knowledgeable practitioners, combine theory and real life
	Practical experience valuable
	Projects teach students that some employees are interested in new projects, but others might feel threatened by what the project might uncover
	Real life projects during studies very important, continuing to learn but at the same time do actual work, helps the transition between university and starting your first job
	Real life projects prepare students for their professional life

C. Appendix: Nvivo codes overview

	Sometimes students naive and think all companies innovative, real life project good learning opportunity
	Student wanted to learn how to deal with innovation in a large corporation because he wanted to become a consultant, master program fulfilled this expectation
	Students get insights into a global company like Autodesk does, their products, get to know people working there
	Students have a lot of responsibility, lead a project, make hands on experiences, privilege for a junior person, takes a long time later to be in that position again
	Students need real life experience to learn how businesses really work, deeper understanding than just storytelling from books, also learn about the importance of social relation
	Students need real life insight to become humbler and to realize that things take time and that organizational politics and structure are challenging
	Students very naive, do not understand how the real-world works, need real life experience, learn while they try to develop their startup
	Students need to get the real-world perspective, sometimes not enough to apply the theory you learned because other factors have to be considered
	Students are also sent out to meet customers, get the full perspective
	They learn a lot from real life projects, actual problem-solving situations, make ideas and suggestions, make theory experiential
	UCI programs get students out of the lab (engineering students), huge learning opportunity
	Volvo large company, difficult to have decisions made, to have budget, difficult to get overview over whole org and relevant people for project, challenges of driving innovation in a large company, try out firsthand, frustrating but good learning experience
	Value created for university
	Autodesk wants to ensure that features attractive for educators who might want to use it for teaching or to get in front of industry trends, future forward trends, to be on the cutting edge and become the go to person
	Branding
	UIC helps with university branding, be known for good education, capable students, proved themselves during UIC
	UIC increases employability of students
	University becomes more visible to smaller and medium sized companies not only the big ones, see how a collaboration with university could be useful
	Complement education
	Negotiate topic that students work on to fulfill company's need but also to hit the learning goals of the course, works best if whole group gets inspired by each other
	The closer students get to experience being an entrepreneur the university knows that they have provided an appropriate education
	The more practical the education, the more ability to apply theories in practice the more the students learn, very good learning experience, better learning outcome
	UCI Beall applied innovation created to linking UCI entrepreneurship ecosystem with that in Orange county, combines all entrepreneurship programs at UCI in one initiative, goal is to help students or staff interested in entrepreneurship to learn more
	Financial value
	Companies also approach university if they are interested in a certain technology
	Public university does not only want to rely on federal money, want to grow the enterprise by looking at the for profit and nonprofit sector, extra income through licensing agreements
	Universities have to work with companies and bring their knowledge to industry to make money from it and to continue to innovate, circle of value creation
	innovation and young researchers try to apply their research

C. Appendix: Nvivo codes overview

	Negotiate topic that students work on to fulfill company's need but also to hit the learning goals of the course, works best if whole group gets inspired by each other
	UCI applied innovation goal was to build a center for entrepreneurship and innovation to work with and stimulate orange county economy
	University looks to have industry perspective
	What FTK could improve
	Attainable goals and clear expectations, have everybody on the same page, shared purpose, goal, or vision
	Be more structured or communicate clearly that it will be unstructured
	Consider that students might come from different cultures and might not be used to take over most of the projects' responsibility
	Good purpose but unstructured except for master thesis work
	When students come to FTK with ideas they say great and go ahead but students seem to need more guidance or be clear that there will be no guidance
	Could connect students from different disciplines that at least write some parts of their thesis together
	Find focus and communicate offer and value clearly
	Be clearer about what you offer, what the benefits are
	Business model unclear, how do they make money, what do the students get out of it
	Castellum did not really understand what FTK suggested, it was a gamble to do it -- be clearer
	Find a focus, think more thematically, build a profile
	Great resource, should promote themselves better, e.g. as a resource in developing a sustainable society
	If lecturer has large network herself no real need for middlemen, make business model clearer
	Be more specific about what you offer, what the benefits are, do not promise more that you can offer
	So far FTK plan B for theses, build excitement, make it more competitive or brand themselves as some kind of safety net, promote their supportiveness
	Student stumbled upon FTK through a friend. did not know about them before
	Think about what FTK could offer differently, some lecturers do not need extra network, mediate between academia, students, and industry, and facilitate collaboration then
	FTK very entrepreneurial, difficult for universities to be that spontaneous, public organizations and certain rules, be more understanding of the university's situation
	Maybe be better not to be a profit driven company, maybe get funded by universities, get more companies interested because difficult for companies to find budget for something that is not very clear at the time
	Update website, talk about the next steps of FTK, see the portfolio, who is looking, offering, previous and ongoing, present current master theses on website, present the different levels on which they are working with students
	What FTK does well
	Connect public and private sector and university
	Great network, connects academia, industry, and public orgs
	very good intent to try to connect public and private sector and then bring in students
	Cost and time efficient projects
	Create interesting collaboration projects for students and companies
	FTK good purpose, create value for students and companies
	FTK values working with students, has big interest
	Interdisciplinarity

C. Appendix: Nvivo codes overview

	Can set up a team with people from different disciplines, a lot of knowledge and theory that they can apply and honest feedback, sth like FTK required to set up cross functional teams, difficult for universities to do that
	FTK connects different disciplines, which is hard to achieve for lecturers across different programs or even schools
	FTK facilitates and pushes interdisciplinary teams which is very important for innovative thinking
	Interdisciplinarity great, FTK can find students to work on ideas that are not finished yet from manager
	The interdisciplinarity, ability to connect students across disciplines
	Mediating role
	Course leaders do not have to look for student projects themselves
	FTK facilitates and make UIC easier, UIC beneficial for all
	FTK provides a safe space with support and a big network of contacts
	Good mediating role, expand the available network, some programs need that
	large network and connect people from different disciplines
	Sometimes lecturers do not have the time to set up UIC, FTK or brokerage in general good help
	Students take responsibility
	Some negative feedback from students, but collaboration taught students to take over the responsibility to drive the project themselves
	You learn a lot and get a lot of experience if there is no clear process when you come up with an idea and you define the process as you go, FTK offers that opportunity
	Uncoordinated but come up with new things
	Very good setup, doing a great thing
	Workshops to see how the master thesis students work fit into company's strategies, where findings could be used

D. Appendix: Example interview guide (interview with I_1)

Interview guide

- Can you give me a short summary of what you were doing at Autodesk and what you are doing now?
- What is your experience from collaborating with students?
- If yes, in which forms?
- What were the typical projects targeted at?
- What was the structure of the projects/activities?
- How much do/did you collaborate with students?
- What is your motivation to collaborate with students?
- What is the students' role?
- What would you say is the greatest value with collaborating with students, and what can they contribute the most with?
- What do you think these projects can generate, that cannot be achieved in other types of collaboration?
- To what degree do you use the results of master theses or other types of collaboration, and in that case how?
- Why do you think it is valuable for students to collaborate with companies?
- Do you believe that your company can directly benefit from working with students?
- Do students bring in ideas? What kind of ideas? Incremental, completely new?
- Do you use some of their ideas?
- Do you think students can be a valuable source for new insights that can lead to innovations?
- What is your experience from collaborating with First to Know?
- How do you see First to Know's role?
- Do you think what First to Know does is valuable for companies?
- Can you think of anything that First to Know could do better or add to their portfolio?
- Do you think that there is a link between company size, organizational structure or company culture and the collaboration with students?
- Do you think students are already innovative when they start or develop it during the collaboration?

D. Appendix: Example interview guide (interview with I_1)

- I got accepted for the Sten A Olsson scholarship and I will spend three weeks in California in March to conduct interviews. The idea is to compare university-industry collaboration in Sweden and the USA. I saw on Autodesk's website that you have offices there. Do you have any contacts there or other contacts that I could interview?

E. Appendix: Interview transcripts

Interview S_1

Interviewer: Thanks for taking the time for the interview. Um, do you mind if I record the interview?

S_1: Yeah, that's fine.

Interviewer: Okay, great. Thank you. Makes it easier with the transcription. Yeah. Uh, so can you tell me more about the master program that you did at Chalmers?

S_1: Yeah, sure. Um, so the first thing that is quite special about that master's program is that it's the only master's program provided by Chalmers that open to outside students like students from other faculties, not from a technical university. Uh, so, uh, the first thing that becomes quite special is the mix of people that both apply and get accepted to the master's program. Uh, so we have a very diversified class in that sense. So we have people partly from Chalmers, bachelors from Chalmers, but also people from, Gothenburg school of economics, people from studying, uh, arts, abroad. Just a very large mix of people. Uh, and then, uh, the, uh, we do the first year, uh, by having like regular courses as every other master's program. Uh, so we, uh, we learned a lot about, uh, digital component management. Uh, we have a large course in entrepreneurial ability from the perspective on the individual and then we have some elective courses during spring where we can choose to focus more on organizing for innovation and how to make uh, international business and subjects like that. And then it sets itself for the for the second year, which is what makes the program quite special recurrence. We don't do any courses other than the master's thesis during the second year. We collect data for our master's thesis is to actually run an innovation project with the partner company.

Interviewer: And do you choose the company or how does it work?

S_1: We were put into pairs like classmates and then we get provided with the partner company. So the faculty sets it up, but we as students are also a part of actually recruiting organizations during the first year for the second year.

Interviewer: Ah, okay. So you already have like some projects or how do you find the companies?

S_1: Yeah, well it depends. Uh, most people try to find, just kind of utilize their networks since before to find the companies that is willing to take on, uh, a pair students for a year. Because I mean, it's quite a responsibility or it's quite a commitment from the company side because they'd have to provide supervision for two students for a year. And they also pay a fee of 300000 SEK to be able to be part of the program. And that is to make sure that they're actually taking it seriously and that they're committed to making sure that the students get a good education and so forth. Yeah. So we're put into pairs and then we're

E. Appendix: Interview transcripts

provided with a company from the faculty, so they decide who goes where. And then then the steps, we uh, we're quite free in what it is that we will be able to do. Uh, it needs to have some kind of innovative height, like the project that we're pursuing. And it needs to be something that the company hasn't already started doing. It has to be something new and it has to be something innovative.

Interviewer: okay and you're like free or does the company give you like an area where to look at?

S_1: I think that, uh, uh, it depends on the company you're at and, uh, what level of politics that is relevant for that company. So for some companies you're quite free and they trust you as a students quite a lot. While other companies are more restrictive and more, uh, uh, they're more, uh, telling you what to do rather than letting you think on your own. So it differs quite a lot. In my case, uh, we had the sense that we had a lot of freedom, but when it came down to it, we didn't really feel that that was the case. So I think that there was a discrepancy between the ambition our supervisors at the company and the actual reality that struck us later. But I mean that's, that's an important, that's a valuable experience in itself. But the whole idea about the program is that we're, we would be able to set our own scope to the project.

Interviewer: Hmm. But did you feel like that you developed during the project your innovative thinking or like your innovation ability?

S_1: Yes, I would say that I did. Uh, I think that's, for me it was a lot about calibrating my expectations. So before going into the program, I felt that, or before going into the second year, I felt that, uh, the more radical project that you can run, the better. So I started off with having quite high expectations and wanting like I had high ambitions as a student. And then throughout the projects for me it became a lot about finding the balance between doing something that was radically enough to actually be innovative at all and doing something that was, uh, enough in line with the company's strategy or, or like their core capabilities. The compromise, for me was that maybe the project itself didn't become very radical, but the learnings was quite valuable in terms of how to pivot your project and how to adapt to the changes and how to adapt to, like the realization that people say one thing, but sometimes they mean something else, which is, how it is I guess in large organizations. I do think that it's quite inevitable and having spoken to a lot of my classmates. Because as a class we meet every Friday to share, we share insights and experiences from our projects and the experience we had, having to deal with a lot of internal politics was something that was shared by all of our classmates as well.

Interviewer: But do you think that was also like, uh, the idea of the university to provide this program to like show students like how the real life works? Like to like teach. Okay. That was so that the students can learn what works in reality and what might not work.

E. Appendix: Interview transcripts

S_1: Yeah, definitely. And uh, I think that the school or like the faculty they, they want to be as little involved as possible as well. But they offer the support that is needed for the project to actually succeed. So for every student team you have like a steering group, we had a representative from one representative from the faculty, one representative from the company and an external representative that you as a student team recruit on your own. So it's kind of an advisory team and you have like regular meetings with this steering group to make sure that the project is progressing as it should. And I do think that that is one of the strength within this program. Uh, it's that the faculty actually puts you in a situation that is supposed to be as close to reality as possible and not something that is adapted to a couple of students coming to do their master thesis. Because I do think you get, I mean, taking on a pair of the master thesis students isn't that big of a commitment. I mean you provide some supervision and you get the academic results in the end. This was about something more than just providing an academic report. We were there to actually have some kind of corporate impact with the innovation project that we run. So I do think that if, the closer you get to experience of actually being an entrepreneur, we or the faculty will see that they have succeeded in providing you with appropriate education.

Interviewer: and did you feel that your project had an impact at the company or that they tried to implement it in some way?

S_1: well our project came a bit special. Uh, like initially we were part of a small digital transformation team, in a larger conglomerate. So the role of this small team that we joined as students was to do digital transformation projects for the different companies within the conglomerate. So our supervisors then put us in contact with one of the companies in the conglomerate where we were supposed to do our, actual innovation project. As it turned out that company had gotten the wrong expectations or hadn't really been explained by our supervisors why we were there. So every kind of innovation initiative that we tried to take was put down because innovation wasn't actually their corporate strategy, and they thought we were there to do something else to provide with them whatever they wanted help with at the time. So we didn't really get the gist of what the actual master program was about, which, I mean that was a communication error between our supervisors and the digital transformation team and the people in the actual organization where we tried to run the project. So after like half, half the time, after half a year. We got to the conclusion that okay, you guys aren't really interested in running innovation projects, so let's go somewhere else. So we switched, we stayed within the conglomerate, but switched to another company, which meant that we needed to start over again, find a new scope and get to know new people. So we didn't really get as far as we would have liked. So I don't think that, uh, or at least I don't feel that we have the impact that I would have wanted.

Interviewer: Yeah. But were you able to at the second project where you' able to, to do something with innovation then?

E. Appendix: Interview transcripts

- S_1: Well, we, we, I think that we provided them with a lot of valuable insights, but we never really got the chance to implement those insights or put them into actual results or to corporate change. I mean, I should say also that there happened a lot. There was a lot of changes, like within this digital transformation team because that was actually canceled halfway through our project. So our supervisors became quite uncertain about their future within the company. And so one of them actually left to start a new position halfway through. So, and then, then the other supervisor, she was was insecure about her future in the company, which meant that she couldn't put as much focus on supervising us as she would've needed. She became swamped with a lot of work since she had to work for two people.
- Interviewer: So you didn't get another supervisor?
- S_1: No, we didn't. But I mean most of the projects only have one supervisor from the company side and we had two from the start, but then the main one quit and a lot of responsibility was put on the other one. But it wasn't a strange thing to have. Only one supervisor.
- Interviewer: But do you still feel that you like became more innovative because like I'm also trying to investigate the development of innovative thinking. So do you think you were already in innovative like before you started your master program or did you develop it during the program?
- S_1: I wouldn't say that I'm more more innovative per se. While I guess it depends on how you define being innovative. What definition do you use?
- Interviewer: Like if you have like a lot of ideas and you look at something and you want to improve it or you want to do something or like extend the scope of what a company for example is looking at.
- S_1: Uh, so one thing that, uh, I lacked throughout the master's program was to actually focus on how to be creative, right? So in order for you to be innovative, you need to have creative ideas. And then the second part of that is having the possibility to actually implement them. I felt that we weren't really trained in being creative, I didn't know that at the time. But since I started working as an innovation consultant, I've gotten more a better sense of what being innovative actually means. And looking back at the program, I do like some kind of introduction to creative creative thinking. So it was more, uh, for me about carrying out, uh, um, for the company unusual project. So I think that no matter th idea that you would have pursued the whole idea or the whole, uh, reason for doing it was to do something that the company wasn't used to doing. So it became more about, okay, how do you navigate the corporation in order to succeed with projects that is unusual to organization. So it's not necessarily about, you know, active projects more, uh, just projects that they are not used to be pursuing.

E. Appendix: Interview transcripts

- Interviewer: But do you think it would have been good, like to have, uh, like a course in the, during the first year about creativity ?
- S_1: yeah. Yeah, I think that can be a, could be a good thing. We do have a lot of courses in entrepreneurship. Uh, and, and I mean that is all about having, having an idea or like spotting an opportunity in the market and pursuing that successfully. But we would need to transform that knowledge into the corporate setting I guess. And that is, I mean that's what we're supposed to do during the second year, but uh, sometimes, uh, I think having more uh, like just putting some effort into transforming the insights from entrepreneurship into entrepreneurship would have been a good thing. But we do get an instruction on how to run project management, introduction to corporate politics and I think that it's also these things are difficult to understand just by looking at the theory. It is something that I do think that you need to experience more to learn and that it takes quite a long time and getting the opportunity do it for a year with a company that is more or less inclined towards letting you run an innovative project is I think accelerating that development even if you don't come very far with your project. So in comparison to learning what we learned in another setting I think it accelerates your learnings
- Interviewer: so you mean like to apply the theoretical knowledge you get at university? Like a practical context`?
- S_1: It's more about I think giving us some practical experience and then afterwards letting us compare that to theory and see what the differences are. More than okay, here's your theoretical ground and I'll go apply it in the corporate setting. So it's almost like starting from zero and then you make the comparison later on. And I mean that's what we do with the thesis, that's where we combine our insights and compare them what theory says.
- Interviewer: Did the program fulfill your expectations that you had when you decided to do this master program?
- S_1: I would say no without putting some kind of value in that I will only, I would just say that what I expected was not what I got, but what I got, was not something bad or worse than my expectation, but it wasn't better either. It was just something different. And I think that is quite inevitable because you can't compare, you can't really prepare students for the kind of, uh, experience that you're going to gain from trying to run an innovative project in organizations. And for us, we ended up being in a very, very conservative organization. And often when talking about innovation or just discussing it at school you don't discuss examples from the conservative companies. You use examples from companies that are really good at innovation. So in that sense I didn't really get what I expected, but I still got a lot of valuable insights.
- Interviewer: And you said you had like weekly meetings with your classmates. Um, did they have like, uh, were their companies a bit more open to the projects because you

E. Appendix: Interview transcripts

said, of course you have to like you have to political aspects that you have to deal with. But yeah. Were their companies more open to like innovative ideas?

S_1: Some were, some were not. Uh, it's really difficult to know, uh, what it is that is making you more or less inclined to run innovative projects. It's very difficult for us to find, I guess you have to read the research of my, my professor. It's difficult to see why some innovations or some organizations are more open and some are more closed, but I do think it comes down a lot to the people in charge. Yeah. So we had, uh, yeah, it's, it's a difficult question to answer. I can say that there are differences, but I can't really say what they're depending on.

Interviewer: all in all do you think it's important for a student to work together with a company?

S_1: Uh, yeah, definitely. I mean, there is, there is a transition between your studies and when you start to work. There's something that we need to go through there and having the possibility to combine those two like doing some running an actual innovation project while at the same time being back in the context. That's a good way to start the transition. It's a bit like these trainee programs, I guess that a lot of people apply for after their studies are done. A Combination of continuing to learn stuff and focus on education while at the same time do some actual work.

Interviewer: I'm trying to figure out why it's good. Like to get, uh, this practical context already while you are still a student compared to like, just start to work right away.

S_1: Uh, yeah. I think you, you will face some challenges when you're starting to work that you didn't face when you were studying. Cause when you're studying you only have yourself to think about, you only have like the only consequences if something goes bad. It's your own. If you fail an exam that's on you but it doesn't have any consequences for anyone else. So the only responsibility you have is towards yourself and when you start to, to work, you will notice that what I do have an impact for people around me as well. I have expectations put on me by an external party and not just by myself. And that is something, at least I had to adapt to and speaking to a lot of friends as well who's recently graduated. There is a transition being just handling the kind of responsibility that comes with having an employment compared to university studies. And I think that the more you can ease into that the better. So providing some practical knowledge or like some practical experiences during your studies I think is always a good thing. And I mean, I come from a, from a civil engineering background and uh, there, there's, it's quite extreme because in a lot of cases, you get out some school and you end up in a company where they tell you, okay, now your real education starts, what you learned in school isn't really worth anything, it's just a receipt of getting through something that is difficult, but now you will actually learn what it is that you're supposed to apply in your employment. And I think a lot of people are shocked when they go from school and get out to like a construction site and are supposed to lead construction

E. Appendix: Interview transcripts

workers, which they haven't had any experience with or got to know the industry or even like set their foot in a construction site before, it's going to be very difficult for them. So the more practical knowledge, we can provide them during the studies, the better.

Interviewer: Okay. Then you're better prepared.

S_1: Yeah.

Interviewer: Oh true. Yeah. And now that you, you graduated and now because you're working from your perspective, um, like for example, Pollen, do you work together with the students?

S_1: I'm actually supervising a master thesis in innovation management.

Interviewer: And now from like the company perspective, do you think it's useful to have like a student collaboration?

S_1: Uh, I think that students have a way of acquiring insights that the a company representative cannot because you can always use the student card when you get in contact with companies and say, we're doing this kind of study and do you want to answer some questions. Uh, and if we were to do that, you we would have to negotiate and find a situation where they get something and we get something. I think that a company is more inclined to help students because I mean, you can take part of the thesis when it's done. Then it doesn't cost you anything to just answer some questions. And I mean also, we don't really have the time for research research related projects. So then it's good to take the help of students to actually do that and acquire insights that can help us to develop our business as well while giving the students a valuable experience. Yeah. It is easier for students to get through the door, uh, and the insights that you provide are actually are really quite valuable.

Interviewer: And we met during the innovation workshop for example. So what was your motivation for that?

S_1: Uh, I mean we, we think it's fun to work with students because you are more open minded than the company we work with later and it's easier to, uh, actually do creative work when you are more open minded. So it's a nice way for us to, to test out some new creative tools. You are very forgiving people and then it's an opportunity for us of course, to get to know you guys and to just show you who we are and what we do and how we work.

Interviewer: Do you also have, uh, any other forms of collaboration at Pollen?

S_1: Not at the moment, no. It's not really us who seeks these opportunities out. It's more people who come to us and asks if we would be interested to be part of it. So with the innovation workshop that was your supervisor asking us if we

E. Appendix: Interview transcripts

wanted to do something for you guys. The thesis that we're supervising, the students contacted us and asked if we would be interested.

Interviewer: Was it your first meeting with Per or the first project that you did with Per?

S_1: Yeah, personally it was, yeah.

Interviewer: Hmm, okay. Yeah, I do think it's like useful like to have first to know like the company of Per, like in between to connect students and companies?

S_1: Yeah, I mean I do think that the more you can extend your network during your studies the better looking at how people get jobs nowadays. It's mostly through building networks, attending events, creating contacts. So, if we can be a part of providing that for someone else that's always, always nice I think. That's helped me a lot. Like I started building my network quite actively during my studies and it helped me a lot to getting where I am today.

Interviewer: Yeah. Like just as a concluding question, what do you think like these industry students projects can generate that you cannot like achieve in other types of collaborations or projects?

S_1: That's a good question. I think it's quite specialist that since you're not an entry at the company, but you're still trying to run an innovation project, you don't have that much to lose. Right? Because if you fail, you will still get your graduation and you still get your master thesis and so forth. So the consequences are nonexistent really and maybe you won't get the project that you expected or the results organizationally that you wanted but the actual downside of failing is quite small and if you were to run an innovation project as an employee instead, like within the organization, the consequences of failing would probably be quite much higher. And that is like proven over and over that the psychological safety that is needed, to actually have the corporate culture that is accepting more accepting towards running failed projects. It's very difficult to first get a place and then when you get a new place to actually keep it and manage it. And I think that as students surrounding these kinds of projects, you would get the unique opportunity to be fearless and to dare to be, be radical and dare to actually challenge the company and to ask additional questions because you don't have to worry about getting fired.

E. Appendix: Interview transcripts

Interview S_2

Interviewer: Can you tell me more about the master program of corporate entrepreneurship that you did?

S_2: Huh. So we have it's a two year program and we have two different tracks. In the first initial year. It's basically everyone is more or less taking pretty similar courses. And so now we have tech creation track. We have corporate entrepreneurship and we have intellectual property and intellectual property track has more select, do courses involve intellectual property of course. But initial courses I would say we are all getting together. And then the second year it's mostly different for all the tracks. In the second year, technology track, they get an idea from Chalmers ventures, which are submitted by the researchers from Chalmers mainly. So they choose one of those ideas which came to this pipeline from chalmers ventures. And if they get a deal with the researcher then they share, basically share the share, distribute the shares, and they create a venture and they work on their own venture over the year. And in the intellectual property track you, they have a half a year thesis. So in other half year they keep taking courses and the last half a year they write their thesis, like in a normal master studies, I would say that is also...They're also pretty integrated with the companies in the industry as well. And then for the corporate entrepreneur track, we basically go into different companies and we, you know, innovate in companies. So it's, it's actually a little bit similar with the tech creation track, but they, ukind of externally innovate and create a business. But we internally innovate, you know. So it's only a bit like internal business creation. So we go to the companies and we don't have any, ulet's say kind of what we have, like a mission, vision and statement, what they want to do, like the company as well in the future. But, uwe are not giving any like a solely purpose and master thesis topic, we kind of tried to dig into the company and tried to find them an innovative as possible idea im that company and industry and we uyeah, move on with that project. So yeah, it's a little bit free and then we kind of create that internal project over the year.

Interviewer: You have like a certain area to look at at the company or are you completely free to choose?

S_2: It's completely free. And also because it depends what innovation is depending on the company and industry. So like we, we aim to do as, you know, we do project as possible, not an incremental, but more like a radical you know, innovation we aim to do, but of course you have to act under the [inaudible] some industries are more already innovative. Some industries are pretty traditional. So the things that you can do and the things that you can call innovative is different. For example, in some industries, application is so like a old now, but in some industries for example, I'm in the GOT parking and we had our first mobile application back in 2000 like a couple of couple of years ago as I recall or something. So for example, mobile application is for them a kind of still new. So it of course changes what you can do within the terms of innovation, but we basically aim to tell them like the future is going to kind of,

E. Appendix: Interview transcripts

you know, look up, match them a little bit and say the future's coming. You got to change. So start kind of confusing the minds.

Interviewer: Ah, okay. [inaudible] So you did your project at a parking GOT [inaudible]. Uh and can you tell me more what you did there?

S_2: Exactly? so we, we dig into some topics to look, try to figure out what we should do and then we decided to do something more environmental since it's publicly owned they don't really have super high financial expectations as the private organizations now. So we thought that we can work more with environmental goals. So, and then we came up with this integrated data solution. So integrated, cracking air quality and traffic data, which would let people kind of reroute based on where the quality's bad and where the quality is good. So yeah, we basically wanted to nudge people, users towards more environmental friendly options. For example, if the part, this part of the city is let's say the air quality in this part of the city is worse, then maybe don't take this route, take another route. So that was mainly what we've been started doing, but we pivoted a lot during the year and then, yeah, it changed it a lot. But yeah, that was an initiative.

Interviewer: Yeah. An interesting approach. Yeah. And did, did did the company implement your idea?

S_2: There are a lot also technical kind of let's say requirements that are not in place in the company. So towards the end we decided to kind of kind of a visually nudge do a visual platform, kind of put a cloud on the application map. We have a map on the, our parking application, but it shows that the parking spots and everything. So the aim was to put cloud depending on the air quality. But then we also did a lot of like the user studies and everything and we couldn't, the company also couldn't really see if environment solely is a way to kind of nudge people, cause they, for example, care more about money and, and time. But they decided to actually combine our project with Västtraffik. So now actually over the last one year after the thesis is I've been working on kind of a continuation of our thesis project, which kind of evolved to be something else, which we are still actually working. We were aiming to do to pilots before the summer, but this Corona hit us so it will be later. But I would say it's still actually related with our master thesis what we're trying to do.

Interviewer: Oh, nice. Yes. So you can there, you were actually able to continue your work.

S_2: Yeah, exactly. So yeah, they ask us to stay, to continue with the project. My thesis partner, he left for another company, but I stayed

Interviewer: [Inaudible]. Okay. So the, the master program, was it useful for you? Like in hindsight, did you learn a lot and, yeah,

E. Appendix: Interview transcripts

S_2: I think, I mean, yes, because to me I didn't think that entrepreneurship is something that you can learn to be honest. I was mostly like, if you're an entrepreneur, you're an entrepreneur kind of. But I'm really glad because I think I really learned a lot like the, you learn a lot of different tools and you, yeah, definitely. I mean, and also I will say the network is another part, but also the tools that I learned. Like I can say that even though I might not know what I might need to do, I know how to look for the knowledge that I need. And also like in the classes that we have been put, like a, we work with a lot of like a real researchers and the researchers. So it was really connected to the real life. So it was not [inaudible]. We did a lot of group work rather than actually studying. Like we didn't really take many courses. I would say listening to courses, it was a lot like a hands on really just being in a different groups, teams and just keep working on different projects, you don't have idea but you just tried to figure it out. So it was, I would say it really helped a lot.

Interviewer: Okay. Okay. Yeah. You also said that you at the beginning you thought you cannot learn like to be an entrepreneur. Because in my thesis I want to investigate if like people develop this kind of innovative thinking. So what was your experience? Did you feel like you improved your innovative thinking when you worked together with a company?

S_2: I mean even before the company I would say I think the also the courses and the teams, cause now the company is actually made, I don't know, maybe it's a public company. So things are pretty slow actually. So that's a little bit maybe also for like, you know, like the entrepreneurs you just try fast, fail fast. So it's a little bit, but I would prefer things to be faster. But in general at the, for example in education as well, like we been in a lot of also real life projects and stuff and I, I definitely think that I improved my thinking. Cause also you kind of learn your way and then a lot of things that you know about like entrepreneurship and innovation that are solely based on what people are under, you are saying. So I think when you dig deep into definitely like you improve the way of thinking. But also I would say the network, like now all my network in Sweden is kind of an entrepreneur doing something which is definitely effecting the way you think as well. Like you start thinking, Oh, that's the, so that is how can I, you know, how can I do something good too? So it's kind of a nice push to each other as well.

Interviewer: Okay. And the network, you mean like the other people from your master program or like in general?

S_2: Also for my master program but also cause you, you get to know a lot of different people internally, externally by working in the company. But also by working for school projects and stuff. So in general I would say like a lot of people in network and.

Interviewer: Like do you think it was useful for you to already get like these practical experiences while doing your studies because now you started working, but do

E. Appendix: Interview transcripts

you think it was good, like helpful to have like this experience before you started like to work 100%?

S_2: I was actually working before my master as well. Yeah. So I worked for one and a half year before starting my master. But for example, when compared to my bachelor, I mean I studied in another country as well, so it might be different here, but I mean I can definitely say that in, I don't know if it's an all Swedish education, but or only my master. But it definitely, like we did a lot of kind of a real projects. So when I start working maybe, I don't know, I had a previous experience as well, but when I started working it was not anything different to be honest. Cause also like the school as it was pretty rough education. I would say like many weekends we had to study and everything. And so, I mean I would say under the mindset it gave us pretty actually preparing for what's going to happen.

Interviewer: Okay. Like why did you choose the program from Chalmers?

S_2: I mean this is hard. So I did engineering and arts as like a double major and I worked in IT. So I was, I had a little bit like a, let's say mixed background. Like I did marketing sales before then I did IT, I studied visual arts, done engineering. So I think I was kind of, couldn't really, I knew that I wanted to do a master and I, but I couldn't really know. And just entrepreneurship, it just sounded interesting. I didn't even think further. And as I said, I thought, I mean to me actually, entrepreneurship was not something that you could learn. It's just if you're an entrepreneur, you're an entrepreneur. But to be honest, I couldn't really find something else that I could fit into as an education. Cause it's just like I'm not an engineer, but I'm not a fully art student. I'm something in between. I do everything a little bit. So it kinda, I just kind of felt like it just fits me and I'm, I'm a critical actor.

Interviewer: Yeah. Yeah. Martin, he also told me about that. It's so interesting for this master program that you have like people coming from a lot of different programs, some from engineering or arts. Like, because I think you do the project in pairs, right?

S_2: Yes the master thesis in pairs.

Interviewer: Was it interesting to work together with people from like different backgrounds or did you realize like a difference in approaches or thinking?

S_2: I mean, over the course of two years master, we work in many different groups and I mean exactly like we had for example we had, for example, someone from patient design as well, physiotherapy. It was pretty wide and I mean I wouldn't think if it's caused by these studying different like be having different backgrounds but also like the personalities are super different and it was like a real teamwork and it was definitely challenging in some ways. And like rewarding in some ways and we actually had like a lot of classes about like team

E. Appendix: Interview transcripts

values as well, how to work in a team, team values which is like one of those most important things in the entrepreneurial startups as well. So they were trying to prepare us in that as well, which is in the real life too. But yeah, I mean it wasn't, it was not easy and especially cause it, especially in the master thesis, we are two people and we were like together all the time, every day, every hour. So it's definitely challenging. But it has been a lot of times that we are good. But I think I also learned a lot.

Interviewer: And like also did you have like different ideas, approaches and like I know because like sometimes when you discuss you end up somewhere else or like you develop your idea.

S_2: Yeah. Definitely. I mean even like, I'm from another culture and my thesis partner was foreign too. Like we even had like a different perspectives and the way that we communicate is different as well. And of course like some, a lot of things that we argued a lot, but I think it's like if you want to solve this, you always kind of find a way to solve problems and you know, find a middle ground. But of course, I mean in a lot of things we were not really thinking the same, but you just discuss and find your way.

Interviewer: And did you also get because I'm also trying to figure out like the motivation from universities. Like why do they encourage students to already work together with companies while they're still a student? Did you get like a, I dunno, like did you learn something about why Chalmers decided to like launch this? Yeah, it's kind of like an unusual program,

S_2: I would think in general Chalmers like in other majors as well. I see a lot of people working with the company's pretty hands on and which I think is pretty, I mean, cause you have a lot of research going on in the school so, but if you cannot carry this academia to the industry, you cannot make money from it, which would stop you in innovating more. So I think it's like a circle that you need to just, you know, create value, like the new research put into the commercial, get some money, create value, do something else. So this is like my opinion, but I think the reason why Sweden is so innovative is one of the reasons at least is that they have a good connection. At least what I've seen in Chalmers they have a good connection between academia and industry. Um a lot of like researchers that are working with like a real actors, even the students. Well the students are the future researchers or people in the industry. So I think it's, it's kinda to get going with this, you know, commercialization and we have this Chalmers ventures, we'll get ideas from researchers. Yeah, basically invest on those companies. So the more companies, the more ideas you have, the more kind of a value you create and the more money you get, which you can put into more development of new ideas. So I think it's a pretty productive circle. Which for example, but because I work in Chalmers innovation office a couple of summers ago in my first summer and one of my projects was actually about student entrepreneurship [inaudible] cause then a lot of as I said, like the researchers master's students or PhD students, they are pretty involved in this entrepreneurial area I would say cause they are really working on let's say kind

E. Appendix: Interview transcripts

of, you know, innovative ideas cause you gotta write theses and we should be, you know different. But they, the school was struggling with getting more like a students, like a bachelor students on board. So we try to do projects with that. I would say that they are still trying with more like a students to get them more involved. But when it comes to like the masters and PhD students, more researchers, they're actually pretty involved.

Interviewer: [Inaudible]. And so how did it work? Like the master, for example, a master student developed an idea and then they approach innovation office and then what happened then with the idea?

S_2: So yeah, if you have an idea you can apply to Chalmers innovation office for basically free consulting about anything about the project, how we'll just get this going. What should you should be doing? And then at the Chalmers innovation office, they both provide you kind of a free consulting where at least where you can go for what. And then they also help you to get initial funding from Manoa, mostly the soft money. And then if you for example kind of pass that first phase and if you're still doing something, then you can apply to Chalmers ventures which is like more set. Chalmers ventures is mainly an incubator. Uso, and then if your ideas get accepted to Chalmers ventures, there's this deal that, for example, there are different sets. For example, Chalmers ventures has this pool of ideas that are accepted in the pipeline, and then, but you are still actually working on verifying different ideas, different like if it's for example, market verification and those kinds of things. Um, meanwhile, there are a lot of courses in Chalmers itself where you can get help. For example, we had this Idea relation course where we are matched with those ideas. So for example, one researcher is saying that, Oh, I have this innovation and I, I don't know which market I should go. Then we do the market analysis. You know, over the course and me for example, come up with, Oh, this is actually a better for to start an animal market. Then you can go to the more human market or the researcher asks something else. Like we do different verifications and I know that there are a lot of different courses in Chalmers. As a researcher, you can get help like free, literally free IT help from the students free IPS help free market research help and everything. While they are learning how to do that analysis they are actually doing hands on with your project at the end you actually get something resolved and the students end up learning it. Uh, so yeah, there are a lot of courses on that. And then after that if you are still going, so you can either match up, for example, if you're a researcher but you are not a business developer or you are not matched with business developer. So you don't know how to, you know, develop the idea so you can then match up with someone in the second year tech creation track. Uand then you can just share it and then yeah, start working developing. Basically second year master students develop your idea with you. But if you are already a team then you can apply to Chalmers venture startup. Uwhat was it? Incubation process, which is again basically, you continue working with your team and if you happen to make it it's like a one year and after that one, if you are eligible enough Chalmers ventures, get some of your shares and invest on your venture. Uso yeah, basically you could go in. So there are a lot of, I would

E. Appendix: Interview transcripts

say that there are a lot of processes that you as a researcher, you as a person with an idea can get help from even when you are studying. So I think that's also what's like a pushing as well. Like in a lot of ways you can get involved like a free help as well.

Interviewer: That's really interesting. Yeah. Like, and in your experience, the people that came to you with ideas, did they have like some innovation classes before or like contact industry or like where did they get their ideas? Do you know? Like when you worked at innovation office, people that approached you with ideas, do you know where they got their inspiration from?

S_2: Oh, it's, it's actually mainly a lot of researchers. So they are doing a research on something already and they figured that this is actually new, that they can for example, get a patent or get a trademark or they, they think that it's actually they can do something about it. So yeah, I mean they basically just can't say that, Oh, I have an idea, I have an innovation, I have something which will you help me. And then here.

Interviewer: Ah, okay. [inaudible] And was it more like researchers working at university or also like for example, a master student?

S_2: It's mostly researchers. So with this like a project, we try to see the ways how we can enroll more students, like a bachelor and master. But it's, for now it's mostly researchers.

Interviewer: Okay. [inaudible] And then like maybe students take the track that you talked about from the master program where you can develop your own idea. Did I get that right?

S_2: No like in the technology track like you work on an idea from the Chalmers ventures, which is actually some researcher's idea. Yeah. So not your idea. And in my track, we, I mean still actually we do our own ideas more or less, but it's in different industries. So you need to just consider it, but you end up with your own idea.

Interviewer: Do you know like why the companies are actually interested in working together with the master students for one year?

S_2: I would say cause I mean we had like one actually kind of small research and like when you, for example, check into the average age of companies it's actually keep, udecreasing. For example, if in 80s, the average age of companies would be like 100, so more or less, if you have a company, you know, uhad like a 100 years to survive. But today it's actually pretty low because the technologies keep evolving as well. So your company has an average age of pretty small numbers. So which means that like if you don't change it then you actually just go, you know, go out of market. I think they are also aware that the market is changing what people want to change is quickly. So they need to do something.

E. Appendix: Interview transcripts

And mostly, especially in the big companies, like they're so used to all these big processes and the same mindsets like actually they don't know like you know, like once you are so stuck in this mindset but in that's why they, and it's like a definitely it's I think like a free labor to be honest. So you basically get like a yeah. People that has no idea about your company. Who has the I think most unlike uwe'll give you the like the, the best feedbacks cause they have no idea. So they will bring like new perspectives and I will say especially in Sweden a lot of companies are aware that they might not be in the market tomorrow so they need to do something. I think that's why it's pushing them.

Interviewer: Interesting. Yeah. And did you also see like a difference because you, for example, did your project with a public company and like the other people in your program, maybe they worked with a private company. Did you like exchange, like your experiences was, did you like feel any differences?

S_2: Yeah, I mean during the last year, so we were basically in the company Monday to Thursday and every Friday we were meeting at the school and all like everyone to kind of exchange ideas. And we also did kind of a joint thesis as well so we wrote two different theses and one of them are joint in everyone in the course in different perspectives, like a sales, finance, entrepreneurial organizational change and stuff to kind of see all those companies that we were innovating like the different perspective. Like, for example, when it comes to entrepreneurial sales, how my company's doing, how your company is doing when it comes to strategy. So yeah, we've been trying to reflect on those differences and similarities, which I can send you as well. I mean I think of course, for example, one of the things was, as I mentioned, since it's a publicly owned organization, we didn't have much of a financial goal cause even if you are like innovating for sustainable future companies need to see if there's any financial gain, right. So a lot of, for example, our other classmates were trying to kind of like, you know, show that financial value. Whereas in our case we were mostly focused on more like a societal value, which would, which was enough for us to pitch the project already. And also I would say in public organizations it's definitely slower. U I mean, I don't know. I, I think I only got, I only work in Chalmers and Göteborg Stad so mostly public organizations I would say. So, but I think in general, public organization is slower as well. So sometimes like you just want decisions to be made, quick fail and, but yeah, it's sometimes [inaudible]

Interviewer: And now that you're like working full time, do you like, do you know, work with students?

S_2: No. I mean mostly organizations take like students once in two, three years from like our department. It's not that an old track actually I think but also since like if for example as a company, I got innovation project students last year, it's probably like either the students are still working it or it's like I'm trying to, you know, work to create value. So I think it's maybe also good to have a couple of years break so that you actually kind of digest the new ideas and everything so

E. Appendix: Interview transcripts

that you can go into new challenge because the new students will come with new ideas. So you need to digest the previous ones already.

Interviewer: Sounds reasonable. Yeah. And like all in all, what would you say was like the biggest value for you? Like, like of the program to have like this whole year to work with a company.

S_2: I mean since I worked before, I mean if I haven't worked before it will be definitely different I guess. But I mean it was the, I mean it was definitely good to be because we were like literally working at the company. So which was a pretty, I would say positive um experience and you're pretty hands on like you are leading a project literally. So which as a pretty junior person it is a huge privilege like you are leading this, this is like a small innovation project. You are leading everything from financials like everything so I think it was pretty let's say hands on and a good experience that is given like cause to be able to be in that position later in your career. You should, I don't know at least work fro 10, 15 years I guess to kind of run your own thing in the organization. I think in that case it was like a pretty good position to start at.

Interviewer: Ah, so you had a responsibility also like the financial responsibility of your initiatives.

S_2: I mean, if they wanted to continue and invest they give you money, but I mean you get, if they decide to invest on it, they will probably give the money. But for example, how much money, like everything they, how much would this project give us? How much would it cost? Like we did also a lot of financial analysis as well. So, and then yeah, you get in touch with a lot of internal external people to kind of get this going. So I think it's pretty like you are running internally a business, a privileged position to start.

Interviewer: So you experienced like the whole process of an innovation, like the idea creation and then like,.....

S_2: Yeah, exactly.

Interviewer: Sounds like a great master program.

S_2: Yeah, it was, it was yeah, I had no expectations, but it turned out great. So I am happy

Interviewer: Yeah, because my program is more theory, but it sounds like you have like a lot of practical experience of innovation.

S_2: Yeah, I would definitely say that like we didn't really sit on the class that much. So it was mostly like we were in our teams just working on some stuff all the time, and it actually why it's, I remember it in the Chalmers page, the master

E. Appendix: Interview transcripts

program page, it's, it says like hands on experience, and I actually had no idea. I was just like, okay, whatever. But they were not lying.

E. Appendix: Interview transcripts

Interview S_3

Interviewer: So can you tell me more about your master program? Corporate entrepreneurship?

S_3: Yeah, sure. Um, basically it's a very practical program, uh, where we tried to get both, um, theoretical and practical knowledge about how to drive entrepreneurship and innovation with [inaudible] organizations basically. So it wasn't really like the regular master program, I think, because it was very, very practical and very much learning by doing and then connecting it to some theory that could, could possibly be relevant rather than just reading a lot of theory and hoping that it can be applied in reality. So he was kind of back, which I liked a lot.

Interviewer: And you did like a project for one year? Yeah. And did you do it at Volvo cars? And how was that?

S_3: I mean, it wasn't fun. And also of course, which I guess, you know, because you've read the, this master program, um, a lot of frustration and, um, it was sometimes very difficult to have decisions made or to have budget or to, you know, have a full overview over the organization and everyone who you need to talk to and so on. So there were a lot of different, um, challenges connected to driving innovation within any large company, basically to try out firsthand. Um, which was at the time really frustrating. But, you know, looking in the rear mirror it was a really good experience.

Interviewer: Okay. And why was it a good experience?

S_3: Well, basically I think because we, we actually got to experience a lot of the things that we were reading about so we could connect what we were doing to the theory and agree or disagree with the theory in our theses, which made it possible for us to both have the experience but also to reflect on it in a very good way. Also, we had all the teachers who had been there as well and we could talk to and uh, you know, have discussions with. Um, I think we learned a lot from having that emotional experience along with the theoretical models.

Interviewer: Wow, okay. Yeah. And at Volvo did you, were you able like to find your own idea that you wanted to pursue or did Volvo give you like a certain area to look at?

S_3: No, actually they said, well it was a department that did a lot of product and service development. Mostly that was kind of the scope. But otherwise they just said, do whatever you want as long as it's good. That was the brief.

Interviewer: Okay. And did you end up doing something like radical or was it more like an incremental innovation?

E. Appendix: Interview transcripts

- S_3: I would say that it wasn't really radical in comparison to the world in general, but it was really radical for Volvo cars.
- Interviewer: And did they like implement your ideas?
- S_3: No, um, basically what we did was, uh, leave a prototype and a business case that we had built. Um, and also like our recommendations for further work. None of us continue to work there. We both took other jobs after the, um, so we basically tried to leave all the opportunities that we had seen so they could pick up on them and try to do something good with them. Um, I've had contact with people at Volvo cars after we finished, one and a half years after and they know about the project still. It was a completely different department, completely different person, um, and they knew about the project still and you know, had it in the back of their heads, but nothing else has happened with it.
- Interviewer: Oh, okay. But do you know, like why Volvo was interested in working together with the students for a whole year?
- S_3: Well, basically what we did with our thesis is, was not really the, to tell people about them as regular thesis. Um, rather like selling our time, um, having us working there 80%, and also reflecting about how the work was done and also how it was done in comparison to the rest of the organization and how the work actually fit into the organization. So I think they, um, they got kind of two consultancy projects basically done by students. One of them was actually the project that we delivered with the prototype and the business case and the other one was a reflection of basically how they were doing with their innovation work. So, um, I don't, I'm not sure that they actually saw that from the beginning, but that was, what they got in the end. Um, I think many of the companies have tried to have students there for a whole year, see it as a kind of trial period before they hired them. Um, I'm not sure, Volvo saw it that way because they did not offer us any type of, of employment afterwards. So I'm not sure exactly what was there. Um, initial thought, but I think it's kind of cheap having two people working for that little amount of money for an entire year on something that could provide value for them. So I think that's probably it.
- Interviewer: Did the the project fulfill your expectations?
- S_3: Oh, we didn't really have any concrete expectations I think. We were kind of, um, when we started out, we were really cautious with, you know, me and my thesis partner with telling people that the most important thing for us during the project was to learn a lot. So I think our only expectation was really that it was going to be tough and frustrating, but that we were going to, so in that sense it did fulfill our expectations, but very, very concrete.
- Interviewer: Okay. Yeah. But did you feel like you were able to develop your innovative thinking?

E. Appendix: Interview transcripts

- S_3: Definitely. Yeah. Definitely. Okay. Yeah. Yeah. Basically we didn't get any, um, let's say frameworks maybe from Volvo cars. Um, had we had a supervisor who tried to give us some feedback and, and tried to help us and he, um, he really wanted to help us in a good way, which was, which was awesome. Um, but I think for us he was very much about thinking for ourselves and seeing what happened when we did certain things and [inaudible] way of learning.
- Interviewer: But do you think you were already like innovative before you started the project and you built on it or was it more like you started thinking this way during the project?
- S_3: Well that is always very difficult to say. You know, you can always ask the question, can you teach entrepreneurship? If you think that you can probably, you can learn more as well, which is kind of positive. Um, I think for me, I came from a design and product development background and that way of thinking was kind of applicable for this type of a project as well. It's just that transfer, that type of thinking into business and into technology and into, you know, corporate politics and whatever you're doing. Um, and then you can kind of pair that with something like a trial and error based mindset I think. And of course we've got to practice that. And in the sense that you're always getting better at what you're practicing, I think it was very, very good opportunity to do that. I think I learned a lot more and became more innovative if that is sth you can become, because we actually did things in practice rather than just reading about it and writing about it.
- Interviewer: Yeah. And you said like, yeah, you're not sure if you can learn entrepreneurship but do you think like the courses from the first master year prepared you?
- S_3: Yeah, definitely. I think it's a debate rather than my thinking or my beliefs. If you can teach entrepreneurship, some people say, and some people say you can't. I think for me, you actually, that did the master program I kind of have to say that I think that we can learn entrepreneurship just like everything else. We're practicing something and we're getting better. I think the courses in the first year prepared us, um, partly with knowledge. Um, but also with the fact that we were kind of set in situations where we had to cooperate with people who had completely different backgrounds. And I think that maybe um, the main learning actually from the first year, uh, me and my thesis partner had different backgrounds. She was, um, she had studied finance also at Handels and I was an engineer coming from Chalmers. So we had very different backgrounds and we also had, you know, lawyers and we had many different types of competencies in the, in the project groups in the first year. I think that was a experience because both, both learning what you do actually know and learning what you don't know. It's a very good learning that you can gain from working with people who have different experiences and also you're getting tasks that you have to perform, which you can only perform with your knowledge to maybe 30% and you have to sit together with other people. I think that was a very good experience from the first year.

E. Appendix: Interview transcripts

- Interviewer: So did it help you like in your team to have someone with a different background?
- S_3: Definitely. I think we've, we were driving different parts of the project and you know, when we, when I wasn't driving I could ask more questions and vice versa. So very good, very good. I think also the first year they gave us a lot of tasks that we didn't really know how to do. Um, and I think that was exactly what happened when we came to Volvo cars, you know, the task, whatever you want, as long as it's good, that is not a very clear task. So I think with all the uncertainty and all the chaos that we had really prepared us for all the sudden bringing chaos that we had over the second year. So I think that was a good thing.
- Interviewer: And why did you choose this master program?
- S_3: I actually wasn't really planning on doing a master. Uh, but after my design and product development bachelor, um, I felt that I, I am not a very detail oriented person and I think all the job ever kind of suiting after having the bachelor required you to be kind of detail oriented and kind of rigorous and creative in like drawing and a lot of other things that I am not good at and not very interested interested in either. Uh, um, I was kind of looking for some kind of different track to take with my, my work. Uh, so I read a course in my third year, uh, which led me into meeting people and finding other courses at Chalmers that you could read that I was super interested in. I had the Customer part and I wanted to have the business part as well. Um, and because of that I've found the masters program and decided to to do that.
- Interviewer: [inaudible] yeah. And did it fulfill your expectation? Did you learn to be more detail oriented?
- S_3: Well, I didn't really want to be more detail oriented. I just really didn't want a job where I had to be really detailed oriented. So I tried to, you know, pick a slightly different track rather be broad than detai oriented. And I think the program gave me that
- Interviewer: [inaudible] okay. So the program was good, like a good choice.
- S_3: A really good choice and I had no idea what I was signing up for, but I'm very happy about my choice.
- Interviewer: Like from your perspective, was it important for you to already work with the company while you were still a student? Like before working full time
- S_3: I think it was crucial actually for, for the program. Um, everything we did over the last year, it was, it was really so to say it was real. It was problems that were implemented and projects that affected people out in their daily lives. Um, and we we were working just like everyone else in the company except from not

E. Appendix: Interview transcripts

having salary. Uh, it was just the same basically. And I wouldn't have done those projects with the same emotional impact, the same feeling of uncertainty, the same, uh, politics problems, you know, everything that got real for us because of the projects were so real. So I think it was crucial for the program, for the program to have those real projects. And we were also selling the project so no one gave us the projects. We rather sold the projects ourselves. So we got the experience kind of of looking for this type of, uh, really unclear jobs that I'm still working. Um, because we had to find our projects ourselves. And I think that was a very good as well.

Interviewer: And did it prepare you for yeah. For your professional career?

S_3: Definitely. I think the way of thinking and acting, um, that you need to adopt when you're trying to do these types of projects and selling these type of projects is something that you as an entrepreneur entrepreneur or someone who tries to do new things, um, you need that otherwise you won't, you can be a terrific person that, you know, istaking, taking something that someone gives to you. Being terrific with that. But I think for me that was not really interesting

Interviewer: [inaudible]. Yeah. Um, and did, because Volvo cars is a large international company, um, do you think that made a difference like for the project compared to maybe like a smaller company or a startup?

S_3: I think like in general you could have this, this real life experience no matter what company you're in because every time it is real, um, so I think if you were to like shape a program, it doesn't really matter. I think people should be able to choose for themselves. Um, for us it made a difference sometimes because we had communications with people in many parts of the world and trying to get information from people in Asia for example, was a challenge sometimes. And we, we discussed with people in LA and they had certain ways of expressing information and you know, these kinds of cultural clashes that you can only get into in an international company. But I think or in a small company you will learn other things that are also very valuable. So making the choice yourself and finding your projects yourself is probably a good way of making sure it's what everyone? Want. So to say.

Interviewer: [inaudible] and do you think Volvo was like, ah, also really curious about what you learned? Compare because like a smaller company might be more like need for like a free consulting. Do you think Volvo was like still really interested in the result?

S_3: Um, let's see if I can say this without sounding bitter. Um, I think people who worked in the company in general were super interested and we had some people in our department who were super interested in what we actually, um, learned and what we saw within the organization. Uh, then we had, um, some other people in the organization who I think were, they weren't expressing really that they were interested and I'm not sure if that was, they didn't have time or if they were afraid of what we were discovering. Um, yeah to just be

E. Appendix: Interview transcripts

nice. We can say that's people who were not very much effected, uh, personally of what we were discovering were more interested than people who were personally very involved.

Interviewer: Okay. Yeah. Okay. Yeah. Yeah. Because like if they're personally involved, because I'm trying to understand because on the one hand, maybe they're afraid of the results, but otherwise maybe you could have helped them because they don't have time for like maybe innovation. It's been a nice opportunity.

S_3: As you were saying, being afraid of the results is a very, um, maybe not a good reason, but I think it's a very usual and regular reason for, for not being interested. And I think we, we learned that there was a lot of turbulence that didn't really have to do with us in the department where we were. And I think maybe listening to also what we had discovered might have increased that. So that might have been the reason for not wanting to hear what we had to say sometimes.

Interviewer: [inaudible] but so like who hired you for the project?

S_3: There was a guy who hired us who, he actually went on a maternity leave, but you know, for, a guy I am not sure how to call that. He was home with his kids, um, for the entire year. So we didn't have that much correspondence with him Um, so we had other managers, there were like three managers for 20 people in our department, and it was kind of sometimes a chaos. But there were a lot of, a lot of really interesting people within our department. I think when we presented?our work, we had, you know, almost everyone was there. The only ones missing were our managers. Very interesting.

Interviewer: Yeah. Because I thought maybe like you need the manager like to push it if it's like his idea.

S_3: Yeah. The manager who, who like took us in, he was away. The managers who were responsible for us, they did not attend our presentations. Very interesting.

Interviewer: kind of sad.

S_3: Kind of sad. Yeah. That's why I'm trying not to be, not to be bitter. Um, but I think maybe there was something behind behind that. Yeah. Hmm. Yeah. There's a lot of politics in organizations.

Interviewer: Yeah. I guess that's also a learning, like how to deal with politics.

S_3: Definitely. Yeah.

Interviewer: Because maybe you're thinking, Oh, this could work, and then you're like in the real world and you're like, Oh, no. Not as easy as I thought.

E. Appendix: Interview transcripts

- S_3: Oh, Oh, Oh. Which makes that real life experience. Very, very valuable. Very nice. Hmm.
- Interviewer: Yeah. Now you're no more like what works? What, what do you have to consider, I guess?
- S_3: Yeah. And I see, I think actually those, you know, you going to a place thinking that everyone there is a grownup and I think that is a likely trap to fall into when you come from school and you come from university. Um, but we quite soon learned that no one is a grown up basically. And when people feel threatened or don't have time or feel stressed or whatever, they're not like grown ups anymore. I think that was a good experience to have.
- Interviewer: Yeah, I can imagine. All in all, what was the biggest value for you from this project work or like the master program in general?
- S_3: Well, I think I got a more holistic understanding for business development in general, which was very good. Um, I think I also got a better understanding for how humans in big organizations work under pressure, and threat uh, and under a lot of different parameters that affect them. But I learned a lot about myself because both I had to, I had to be, um, strong in what I knew to be able to contribute. I also needed to listen a lot to be able to learn from others who had other experiences. Um, and I also got very frustrated sometimes, which was a big experience and learning how to um, put that aside when needed but also to speak up when needed was the variance. So I learned both a lot like on the of the subject. And I also learned a lot about, you know, what my colleagues and friends knew but also learned a lot about myself, which was very good thing. I think that almost helped the most right now cause that is something you can't really Google.
- Interviewer: True. Yeah. Interesting. Yeah. And like now that you're like working full time, do you have experience with working with students?
- S_3: No, actually not.
- Interviewer: Okay.
- S_3: Um, we had in my previous job we were coaching startups. Uh, and some of them were still in school. But I would say that that, those, just the closest that I got. Otherwise, I want to work with students badly, it would be a lot of fun.
- Interviewer: Yeah. Yeah, yeah. Now, like from your company perspective, do you think, do you also would see like why it would be like beneficial to have students?
- S_3: Definitely. I think right now I'm working for a startup and we are five people and we are only three in stockholm. The rest is scattered. Um, so I think for us we could probably not really afford to pay for having someone come in and do

E. Appendix: Interview transcripts

master's thesis and so on. However, I really think that we could benefit from having people from the outside coming in with their expertise and knowledge. And I think master's students are a very good source of, you know, both knowledge and eagerness to do something good and to learn. And I think that is both something that of course companies can use, but it's also an attitude that companies really could use. So I think bringing that into the organization is a very big value with having students there, having someone who looks at new ways and has that energy to learn and to ask questions, that's a very good thing.

- Interviewer: Hmm. Yeah, I can imagine. Yeah. And because I saw your work with employee innovation, employee-driven innovation. Yeah. So you like analyze how the employees could be more innovative or what do you do?
- S_3: No, we actually have a software who helps companies, uh, involve employees in innovation work basically. So is that, do you um, had hand outs, uh, the software to everyone in the company and it helped everyone to contribute with ideas and thoughts and build on each other's ideas and so on in a very good way. Um, so that makes it possible to actually allow everyone, even in big organizations across the world to do innovation together.
- Interviewer: Ah, so it's like a platform.
- S_3: It's a platform.
- Interviewer: Yeah. Okay, nice. Okay. Yeah, I'm thinking I'm already through with my questions. Awesome. Yeah, it was really interesting. Um, the master program is really nice because I haven't heard about it before. No, I just met Martin at an innovation workshop and then he told me about it and it was really interesting because you have like this full year of practical experience. Yeah. Yeah. Because like for me, I study innovation management, but it's like really, okay. So we had like one project, a little project. Yeah. It's nice. I think you get a lot more insights than just like reading articles and books.
- S_3: I think on the other hand when you come out, you're going to have that practical experience as well. Just remember to reflect on what your experiences are and tying it back in your head to what you already know and then you're going to have, you're going to have a very good experience as well.
- Interviewer: Yeah. That's what I'm interested in. Like if it's like important to have like this project or like this practical experience before you start or if it doesn't really matter,
- S_3: I think the more practical experience you can have the better always. Um, but you know, life's life's long. You're going to have that practical experience when you start working. Maybe you have to spend a year or two out in, in, you know, working life before you get that experience. If you haven't done it in school, but it's not world, I would say. Hmm. Yeah, I think it's more about, you know, being

E. Appendix: Interview transcripts

open to trying things and being open to learning things and being open to doing things that are uncertain and scary. Then you're going to help in situations that that maybe I was in school, but you were going to be in later. That's not really a problem, I think. Yeah.

Interviewer: Yeah. As long as you keep that attitude, I guess I'm not sure if you start working, if you lose this openness to like try new things,

S_3: I think that's up to you. Yeah.

Interviewer: Yeah. Maybe also depends on the company, but yeah. Yeah. If you keep that, I think that's like really important.

S_3: Yeah. I think for me, like the attitude of you are owning your own life, so to say is, is really important. So if you end up in a company where you cannot really do things that you feel are developing you then maybe change employer or speak up as you can get, get that change. Maybe more people think, think in that sense.

Interviewer: So yeah, no, it's up to herself.

S_3: Yeah, I think it is. Maybe we just have to quit Corona.

Interviewer: Yes. Yeah. It's the perfect time to start like our professional life.

S_3: Oh, funny though, because you know, if you're, you want to start working in the, in the fall, hopefully everyone is, you know, starting again, starting a new society, which we're going to be in. It's going to be scary and we're going to need people who can think differently and who is not afraid of finding new solutions when things fit. So I think for people who are experienced in innovation and know how innovation works, and that it is not a problem because it feels scary. I think that it's very good thing to bring with you to the, your working life.

Interviewer: Yeah. I think it provides a lot of opportunities now because you have to like reinvent some businesses or do something differently. So yeah, I hope they are like interesting job openings. Yeah.

E. Appendix: Interview transcripts

Interview S_4

Interviewer: Can you tell me more about your master program?

S_4: Yes. So, uh, in general, uh, it is Chalmers university of technology, then from I think 1997, they started Chalmers school entrepreneurship and then now they have, um, three different tracks. So we have one track that is a venture creation, one that is intellectual capital management, and then one that is the one I went to. It's a corporate entrepreneurship track. The first year you, you, you have the same courses and you have students coming from either a management or business side from their, from their bachelor's degree. You have, uh, people that have studied some sort of technological, um, bachelor's degree. And then also you have, um, law students. And so the focus for the, um, for the school and for the first year is on intellectual property about how to create business around that. And then in the second year you spent we did the, went to the corporate entrepreneurship track. We've spent 80% of our time for a year, uh, at a large corporation. So I was at Volvo Penta. Uh, yeah, that's, uh, I think in broad, in a broad sense the master program

Interviewer: and like why did you decide to do the corporate entrepreneurship program?

S_4: I think I or I, I know when I started the program that I wanted to, uh, work with, uh, with consulting, um, and I wanted to get kind of a new perspective on, on how to deal with innovation within a large corporation. Um, I think that's very fascinating. I mean, uh, just, just the fact that all of the, uh, companies that were there were once were so successful, like Nokia and so on that they didn't manage to, to sustain their, their, uh, innovative strength and, uh, ultimately went not completely bankrupt, but lost, very lost a lot of their market, uh, market share. Um, so I would just, I, I wanted to, I knew I wanted to work with consulting and I wanted to kind of see the inside out perspective on how to, how to deal with innovation within a large corporation.

Interviewer: Okay. And like, did it fulfill your expectations?

S_4: Uh, the master program?

Interviewer: Yeah.

S_4: Yeah, definitely. We, we had a, and we had, uh, me and, uh, one other person, we, uh, were teamed up and we were part of the, uh, business, uh, development, uh, sub team at Penta. So we had, we had, uh, I think there was a team of I think 10 or 15 people there exclusively work with new, new, uh, business models, new, uh, products and so on. Um, and we, uh, we had the opportunity to work with, with them and we got, uh, 45 ideas to actually start off with because they had, uh, an internal, uh, innovation competition. And then they, uh, yeah, 45 ideas which were submitted. So we have, for the first two months, we had like an idea evaluation phase where we tried to kind of see,

E. Appendix: Interview transcripts

okay, where do we, where do we have the capabilities, where, what value could we bring in this fairly short period of time of, of, of eight to nine months. And that is from September through April. May. Um, yeah. So, and then we, that we, um, evaluate to those ideas and then we chose the one that we wanted to work with.

Interviewer: Okay. Interesting. And was it like a, an incremental innovation or was it more like radical

S_4: we had many discussions around that. I think from a perspective of like our professors and so on. I think they wanted us to pursue something more radical, which is really the course or the purpose of corporate entrepreneurship really, that you kind of try to work on something that you're not working with right now, but that is maybe, maybe will be relevant in a couple of years. Uh, but, uh, then we kind of shifted and tried to create something that could be implemented, uh, before we, uh, before we ended our year. So we had this idea that you could work with, uh, uh, the leisure segment of, uh, of uh, or the leisure, both segments of Volvo Penta, uh, people that have boats for just for fun. And we wanted to kind of create a, uh, kind of a turn key solution, meaning that you just leave your key and then you have a dealer or a mechanic that takes, takes care of the whole boat and you just pay like a subscription fee. But then we kind of realize that when we had our interviews, that that was too, too radical for, uh, for the company to even adopt any of it. So we kinda narrowed down our scope to something less radical.

Interviewer: Okay. But like, did I get that right? The idea came from the innovation competition?

S_4: Yes so they had the over everyone at the company was able to submit their ideas for I think two weeks on new services. You had many, many different ideas. Many were radical, many were like a incremental many like in terms of the core business and many were like, yeah. Things that they don't normally do. Um, yeah. And then we got this, uh, this list of 45 ideas, and just they, they said to us basically that, uh, please help us, uh, kind of figure out what we should, what ideas do you think have potential and what we, what we should pursue and, and have some sort of plan for how we should, uh, uh, execute on these ideas. So we were able to interview people within the company. Uh, and uh, yeah, we went to team meetings and we also went to boat shows and then we went to Germany. Uh, and, uh, we went to many different dealers also had interviews. We, they kind of opened up their network to us and we were able to kind of really, really get the full experience I would say.

Interviewer: So you were actually able to develop the idea?

S_4: Yeah.

Interviewer: And like in the end, was the idea like, implemented?

E. Appendix: Interview transcripts

- S_4: I don't know. I think, I think definitely they use some parts of it. I don't think they had a, the problem is that, uh, when, when you, it's like in everything that if you don't have someone that is, that is, um, um, responsible for just, I mean, implementing that you have not, you don't have an assigned budget or you don't have an assigned project leader for that, uh, or a specific timeframe. I think, uh, it's very difficult to implement those things. But I think we, through our meetings and through our, um, yeah, presentations and so on, I think we definitely had had an impact, at least on the whole corporate entrepreneurship thing. But I'm not sure what they actually did with, uh, with the project.
- Interviewer: Um, yeah. But did you feel like you could develop your innovative thinking in some way? Uh, because of the project?
- S_4: Yes. I mean, we had, um, we had these different tools that we had learned in the first year, kind of like minimum viable product, you know, business model canvas, these different ideas around how to kind of manage or, yeah. Around innovation management. Uh, and also very much in this start phase and since the first year of our, of our masters had this, uh, perspective of a, uh, intellectual property, a lot of things were, uh, had, had to do with a competitive advantage. So meaning that, I mean, what could, let's say, we, if we, when we, when we pursued our ideas, what here could actually make a difference and how could Penta in this case, then, uh, protect this idea from others. So I think we have that, uh, uh, that perspective when we came in, but we were definitely given, uh, uh, the tools perfectly from the first year, also like how the second year is structured to really, so you have, I mean you have Monday to Thursday to spend at the company. Uh, so you will have a lot of time. You have a lot of uh, uh, yeah, tools and structure around how to really create something. There was something that we wanted to kind of, uh, when we moved from this radical space more to the incremental or more to the implementable phase, we also really wanted to kind of be concrete in what could be done and not just, you know, in this a lot of times there's a lot of, you know, buzzwords and a lot of, a lot of words around, you know, future and so on. But we wanted to really make something that could really help them, uh, going forward. Something they can really, really use.
- Interviewer: so like it helped you to see like the practical context where you could really apply the tools.
- S_4: Yes. I think, I think there's, there's really no, that's the problem with like entrepreneurship or innovation in that sense that I don't think that you can really, I mean, you can simulate to, to, to, to uh, to some degree yeah. Have a project in school, but if you're not really out there talking to customers, to, to suppliers to dealers to employers, say employees. I mean everyone that is part of the stakeholder mapping, I don't think you can really create something that has enough value for someone to really, uh, invest in or use, uh, otherwise. I mean you can create something that is innovative, but I think if you, if you don't really have, uh, uh, the ecosystem of people to really discuss this with, I think that's a, uh, I think it's very difficult to really learn what it takes to create

E. Appendix: Interview transcripts

something new because we realized that that was really, really hard once we got to know all the people and where like the as is state, I mean really looking into, okay, what, where is this company in terms of innovation? Where's this company in terms of digitalization? Where's this company in terms of, you know, creating new channels for reaching customers. Once you get that picture and you start talking, people and really what they need. You realize that a lot of them are still using pen and paper. Okay. And then it's very difficult to talk about, you know, subscription fees and apps and uh, uh, these different things. So, so I think, yeah, that, that was something I definitely learned that you really need to go out and talk to customers and talk to suppliers and people that are part of this. I mean, your stakeholders.

Interviewer: Like, did it also help you with your current job? Like what'd you learn during the project.

S_4: yes, there are some, uh, some parts of it. I mean, my, my, my previous project was, was more around this, uh, where we help the clients create the new commercial service offering. Then there were, was more around a minimum viable product talking to customers, being iterative in the process, you know, you kind of being, you know, uh, moving or tweaking your, your idea, tweaking your business model, tweaking your, I mean, everything, starting interviews based on your data and so on. Uh, but I've seen some, I mean, definitely just, just the whole, just the whole notion of, um, not being able to really create something before you really meet the user of something that's, I think that would, that would be my biggest take away from, from, from my masters I say. If you really want to create something new for someone. You really need to understand their pain points, you really need to understand and understand, uh, what their problem is and how you can solve it with your, your product or service.

Interviewer: Yeah. I can imagine. Hmm. And why do you think companies are interested in having students working for the company for a year?

S_4: Uh, I think there, there are multiple reasons. I think one is definitely in terms of a brand, a brand image. I would say. I think just, just, just a matter of fact that you have a company that can many times be perceived as the, you know, uh, very stiff and uh, uh, old school or maybe not so much happening. We had one company that was part of that was a public sector company. Um, so I mean I think that's one part that you, that you really want to send the message that this company is really innovative. I think one second part is, uh, really that there, there are, uh, things that we learned in these master programs that are fairly new to people. I mean, this whole notion of working in an agile way and uh, working with, uh, yeah, business model canvas and um, you know, tweaking the customer's value proposition and so on. I mean, that's, that's something that is fairly new to companies. And I think when you get students coming in, you know, and we, we had sessions where we talked about our tools and our approach and everything and I think that's something that we could really, we could, uh, be helpful in, um, in, in kind of learning or teaching them how, how

E. Appendix: Interview transcripts

they could use some, some tools. Uh, I would say those are maybe the most, uh, the biggest reasons I would say

Interviewer: [inaudible] and like, because Volvo is a large international company, id they take you, or like your, what you said seriously because, uh, if for example, you look at a small startup that doesn't have like a lot of budget and is may maybe more need for like ideas coming from students, but while for example, it can also hire consultants, but did you still feel that Volvo took your ideas seriously and your insights?

S_4: Yes. And also definitely the process of getting there maybe more than the end product, I would say. So, uh, we had many, many different meetings with, uh, with people that were fairly high up in the, in their organizational charts. Um, and they really, we had a really good, uh, sponsor internally at, uh, at Volvo they really wanted to kind of open up doors for us and really help us to learn as much as possible and to learn to, to, to kind of create as much value as possible. Um, so I think, um, yeah, I think the process of getting there was probably even more rewarding and more as you, as you put it, being taken seriously I would say definitely. I mean, of course there's always this, uh, this, uh, problem with credibility and having, uh, not having as much as experience of course, as, uh, as maybe I have now working one year with, within management consulting. And also, I mean, if they, if they wanted to create something new, they could also have, they, I mean, they have consultants in from almost every, every consultancy firm I think has some sort of connection to Volvo. Um, so, uh, yes.

Interviewer: why do you think it's important for students to already get like, um, this project or practical experience, um, before they graduate?

S_4: I think it's very important to to kinda understand how, how, uh, how it really works with working in a project, uh, having something you need to deliver and not just simulating things. I think school is very, very good at, at um, with fairly smaller resources, uh, simulating, uh, you know, something, you have a, um, you have a paper you need to write, you have a presentation, you need to make, you need to make a company evaluation. But I think this type of program really gives you the opportunity to really see how, how it is working at large companies. Um, and also as I said before, uh, the importance of really talking to your user and using the network that you build and building that network all the time because we really, we, we realized that maybe we got a few names from our sponsor. Like, yeah, maybe you can talk to these people. And then we asked them after our meetings okay, do you have any, do you have any suggestions that we could talk to? And then doing that and really maintaining that relationship with going to lunches and so on. You really learn how, how important it is to have a, to have a, a, a large network of people.

Interviewer: Okay. Yeah. And you probably also have like the chance like to build it your network. And like all in all, because I'm trying to look at if students are already are already innovative before they work with a company or if they completely

E. Appendix: Interview transcripts

develop it while they are at the company. Did you feel like you were already like innovative or had like this way of thinking before you did the project?

S_4: Yeah, I would say, I mean, I don't think, uh, I don't think the usual student in my class or in any class that has this entrepreneurship or innovation thinking, I don't think the average student, um, is you know, stiff and doesn't like, you know, new new businesses and new ideas and new products. I think the average student really likes that, I think and has that interest and is curious about these new things. Otherwise you choose something else. But I think, yeah, what it gives you is, is something you are given the tools in the first year and then you were given an ecosystem of people that you can ask for. Um, yeah. For, for, for, for any questions you have or, or discussions around anything. Um, so you're, you're kind of given this, uh, environment with the tools and with the company and with, uh, with the, with, with the innovation, um, yeah, effort that you, that you really put in, you're really able to create something. And I think that's something that really, that, that, that is kind of significant or, or very typical I would say to students from, from this type of program that you really like to create something that you really like to see something that you have put in your, your innovative thinking, your creativity into that same environment. So I think that's the most important thing.

Interviewer: now at your current work did you already have the chance to work with students?

S_4: Uh, no. I have not worked with students. I've had a, we've had a few employer branding events, uh, where we've had cases and so on. We haven't worked with students no.

Interviewer: But could you imagine like that it would be valuable to have like some students on your project?

S_4: I think we, I mean we have, we have internships for that. Uh, and I think an internship is, is good, but I think it's maybe too structured to be able to create something completely new. I think when you have this project that we had, you, you have basically a year and you're given the opportunity to create something for a year. So I think, uh, for, for my company or any consultancy firm, I think it's much more around, uh, delivering something very, uh, how do you say within a timeframe that is maybe shorter than nine months. And so, uh, I don't think for my part that currently that I could see really that that would be, um, be, be interesting just because that, just because as consultants we help other companies create something new. But I think as if I would have worked maybe for Volvo or SKF or for any other company that is maybe more industrial, I would definitely, definitely root for, uh, for more students coming in and working. So I think it depends on what or what type of a product or services you offer to your customers and clients.

Interviewer: [inaudible] yeah. But do you think you need like a project really designated to like, like an innovation project where you say, okay, you have like one year and

E. Appendix: Interview transcripts

you can develop an idea? Or do you think it also helps if students are like an intern and they bring in ideas just because they observe maybe the daily work?

S_4:

I think it's, I think it's beneficial, I think as much as much new, new fresh minds and curiosity and creativity as possible in any angle. So I would definitely say that I just, I'm just saying that I think that it would fit more to, to a company that is creating some, uh, some product maybe or that is a bit more, you know, that they have their own processes or uh, products that they sell rather than that you come in as a student that then to a consultant through a consultancy helping others. It's, it's somewhat two stages. But I think as I said again, I think is as much curiosity and creativity as possible and I think students coming in and having, having a new, fresh perspective and the latest tools and methodology around how to create something new, I think is, that's just, that's just great.

Interviewer:

Yeah. Okay. Thank you very much. I think I'm through with my questions. It was very interesting. Thank you. Yeah. It sounds like a really interesting master program.

E. Appendix: Interview transcripts

Interview S_5

S_5: Maybe we can talk while I figure this out. Okay. Here, are you in California? Yeah, I'm in the Irvine. Oh, okay.

Interviewer: Yeah, it's just, I have to do all the interviews by zoom because of the Corona virus.

S_5: I know. It's like the worst time.

Interviewer: yeah, so I'm writing my master thesis in Sweden and then they gave me a scholarship so that I can go to California to compare the situation in California with Sweden. That how to university industry collaboration is not, uh, how much, uh, it exists, for example, here in Irvine with the Beal applied innovation and in Sweden I work together with a company that tries to connect universities and industry so that students can already get like some insights from, from the industry while they're still studying.

S_5: Oh, okay. That makes sense.

Interviewer: Yeah. And I want to like find out, um, how this collaboration helps students to become more innovative. Like to build their innovative capability and thinking.

S_5: Yeah, I'm listening and trying to video at the same time.

Interviewer: Yeah. Um, can you tell me a little bit about what you do as an RTG fellow?

S_5: Yeah. So I'm, I'm uh, this is getting really desperate now, a full time PhD student and um, so basically the UCI patent office or they call it the invention transfer office. Um, basically what the, what their job is is to take all of these scientific and engineering inventions and turn them into patents. And for them to do that, they have a team of lawyers and um, well mostly JD, but they also have some JD PhD, you know, patent law people. But a lot of the work they do is translating that science and technology work into the, uh, I guess, um, language of, of law. So they meet for, you know, because of the, the volume of, um, the, you know, the research that we do at UCI, they need interns or fellows, they call it to help with that process. Because for PhD students, it's like four or five, six, seven of us. There's a rollover. Some people come and go. And, um, what we do is we read the original, uh, um, they call it a record of invention and we decide to kind of summarize it in our own words, how to turn that into more lay language so that everybody can understand what this entails without giving away, um, the intellectual property secrets. So that's really our, our role. It's part, part time job so it doesn't involve a whole lot of hours per week. Um, and um, yeah I just started like couple of months ago and then like they already closed it down because of Corona

Interviewer: Ah, okay. So you're working from home now?

E. Appendix: Interview transcripts

- S_5: Yeah, I, I'm, I'm still working. I'm doing my last case right now. I don't know if they're going to give me another one after I'm done. Um, but um, I'm, you know, you can perfectly do this at home, say shouldn't be a problem.
- Interviewer: Okay, nice. Yeah. And like that, the other time you used to write on your, uh, PhD thesis,
- S_5: basically I made research and everything else that you need to do.
- Interviewer: What was your motivation to become an RTT fellow?
- S_5: Um, I think I mostly wanted to explore, um, other like learning opportunities because we need a PhD student. All you do is research and it gets very boring. Um, I mean, at least for me, and this is, it's also a paid opportunity. I get to learn something. It's good networking. Um, I had a friend who was a fellow and she recommended it to me. Um, and you get paid and then, yeah, it's, there's just so many good things about it and it doesn't take that much away of your time. It's like a hobby. Okay, nice.
- Interviewer: And like the inventions, that you talked about that you tried to translate, uh, are these inventions from like researchers from UCI also had students from UCI?
- S_5: It's so, it's typically because teach, the professors here don't really do anything. They don't let me just mostly write the grants and do the advising, but they hands on research is done by PhD students or post docs. So, um, the applications, I see it's basically almost always a professor and GSR graduate student researcher on or a postdoc on the application.
- Interviewer: And so because I saw that the fellowship is somehow connected to the cove at UCI. So can you tell me more about the Cove and how does it work with the cove ?
- S_5: The cove is basically UCI Beall applied innovation. It is basically like an institution that was built at UCI where they promote, um, entrepreneurship and innovation. And so if you, they want to basically take all the scientific and engineering innovation that's been done at UCI and turn it into, um, uh, entrepreneurial ventures or in other words, they teach you how to do that. So most PhDs or even professors, they have no idea how businesses work. They don't know first thing about raising funds and in terms of like in, uh, in the private sector and the industry sector. So they actually do a lot of stuff. If you Google applied innovation UCI, you'll see they have so many stuff. Um, they provide tiny grants. They, they have, I should probably look at it and they have like, um, have programs that, um, they train students how to, uh, translate their research into businesses. But you know, the, the good thing about that for UCI to have an institution like that or have a place like that is if any of these inventions turn into a company with UCI and they make money, the company profits, then UCI is going to take royalty for the licenses etc. So this is why they're so invested in

E. Appendix: Interview transcripts

this because I mean, there are, we have so many different labs, I don't even know the numbers, but we have thousands of research labs. Even if one of them, um, becomes successful and makes million dollar revenues per year, UCI gets a big chunk of that. So it's financially, um, reasonable to have, uh, uh, a resource like this. So they have bunch of programs for students, for faculty. One of them is ITG, but ITG is basically working directly with the patent office. So they have, they have so many different things. So ITG is one of them.

Interviewer: And, uh, were you involved with the Beal applied innovation when you were studying at UCI?

S_5: Yeah I participated in a couple of programs. I participated in iCorp, which basically they, I Corp is a marketing, um, um, program where they, it's like how many, like four or five weeks and they teach you go out there and do market research. What is that is, um, interviews with prospective clients. Um, so I did that. It was okay. I feel like, you know, I learned a little bit. It helps when you're not familiar with this field, but I was already familiar, so it was a huge learning opportunity. I think I also participated in there. Um, there was something else I can't remember, but that was a couple of years ago. And then those were all like free programs. I was just a student. This thing is, I'm like, I'm kind of like an employee, so this is a different situation as, as a fellow I'm an employee and then I help, I think it's, I like it more than the other programs.

Interviewer: Okay. So you prefer being a fellow than taking part out of programs or what did you mean?

S_5: Um, like the other programs, everyone can participate, but this is more like a selective program where you become an employee of the cove. That's why I like it more.

Interviewer: Okay. Okay. But did do like feel that it's helped your innovative mindset, like these programs at the applied innovation?

S_5: Yeah, yeah, for sure. I mean it depends on how involved you get. I'm not a big fan of patent law, um, like I thought about it, but it's not something I want to pursue patenting is a huge field. Usually if you have a PhD and you go get a JD, um, you can become a patent lawyer. But I think it's a bit dry for me. I like learning. I love learning and I like learning about everything there is to this, but I don't want to pursue this professionally.

Interviewer: Yeah. Yeah. Like how, how these programs at UCI applied innovation helped your innovative mindset?

S_5: Oh yeah. Yeah, for sure. I mean any learning opportunity helps getting, just getting out of the lab is great. So yeah.

E. Appendix: Interview transcripts

- Interviewer: Yeah. Is it like the only connection or like the only possibility at UCI to get into contact with like real world circumstances somehow?
- S_5: No, it's not. I mean, there's a lot of like clubs and like groups you can join. Um, most of them they don't pay you. I think it's pick and choose. Like I have friends who are involved in recruitment or friends who write articles on scientific articles, kind of like in a mini, um, newspaper for UCI. But like, that's not my cup of tea. I don't enjoy that. So I like this because also a lot of these interventions, they're private, right? Nobody can get to see these applications. What you see is a non disclosure, um, a version online that doesn't really touch. So I get to see some really intimate scientific and engineering emissions. Obviously I can't about them because I signed an NDA. But, um, but yeah, like you learn like, Oh wow, these people get it this way and how did he get to do this? You can't steal the ideas. But for me it's just going back to your question and opening your mind, it really does teach you one.
- Interviewer: And like while you were like participating, like were there any aspects that you thought this could be improved or they could add that like to make it better?
- S_5: A lot of these inventions are out of my fields actually. It gets really difficult. Trying to translate them you have to understand what's going on before you can even translate it. So not really. Typically I don't, I don't have enough expertise to criticize of the scientific aspect. I can criticize, I can basically, um, comment on the way they wrote the record of invention, but I can't, um, I can't really decide, Oh yeah, the microfluidic device should have been designed this way. Um, but also I'm just the first person in this process after me there is going to be all of these licensing officers , who have JDS and it is, it's a multilevel thing. I'm just, we're just the first people who get to see the innovations before they get moved off through the patent process.
- Interviewer: And uh, also like the fellowship, um, do you usually like do your PhD and then you stay at university or like, uh, what do you do after the fellowship?
- S_5: You mean on a daily basis?
- Interviewer: No the fellowship is it more that they have help with the administrative work or do they show you their university work life and they want you to stay?
- S_5: uh, I have no idea. I think my position is just for PhD students, which means you're no longer a PhD. You leave also, it's part, part time. So it's just not a full time thing. Um, I think if you are interested you can apply and stay at the cove. Actually UCI applied innovation hires a lot of, uh, graduated PhDs from UCI for different roles, but you'll have to apply for them. You have to be interested. But this particular fellowship is just for PhD students.

E. Appendix: Interview transcripts

- Interviewer: Okay. Okay. I get it. Okay. So, uh, when you are at the Cove, so do you observe like the different programs of Beall applied innovation or because you're all like co located at the cove, did I get that right?
- S_5: Yeah, yeah. We are all at the Cove. Yes.
- Interviewer: Because I was also wondering like, uh, to like to study more like what UCI Beall applied innovation does like, well, or like what could be improved, you know?
- S_5: Um, I don't quite understand the question. Do I observe? What do you mean?
- Interviewer: So, because if, for example, you took part in iCore in this program and the other program, um, were there any aspects that you thought could be improved?
- S_5: Oh yeah, for sure. Yeah. I don't think any program's perfect. Um, I don't think I cared enough to sit there and analyze all the problems with these programs. But like, yeah, especially iCore, I think ITG is fine. I haven't really picked up any items. The person I worked with directly, he's great. None of the fellows have had any problems that I know of. But like icore, the one of the other programs, um, yeah, it was kind of, uh, um, it wasn't that huge of a learning opportunity. And I, I mean, I don't, I don't want to complain. It wasn't the greatest. They could definitely have room to improve, but I don't, I don't, I'd never thought about exactly. I didn't itemize it. Like what did they need to improve?
- Interviewer: Yeah. Ah, okay. Hmm. And also because I wanted to look at like the innovative mindset development of the students. So do you think people that apply for these, uh, Beall programs, are they already in a innovative when they like start to programs or do you think there's like also to, they improve because of the program?
- S_5: I want to, so if you're applying that, that you already have something in mind. A lot of the students, PhDs and faculty, some of these programs pop to join to research faculty, right? Um, when they apply, they apply because they already have some kind of business idea in mind. Um, so yeah, for sure they're ahead of the curve because like most PhD students, they're just kind of like super academic minded. Um, so, and they don't really leave the lab all that much. So these guys are definitely, they have more entrepreneurial spirit. Um, and then this program just helps them get there because they have resources, they have small grants, they have, um, business people who can, who hold workshops. So Beall applied innovation, they have a calendar online and like couple times a week, not anymore because of the virus, but usually they have these really cool workshops, like how to raise funds, how to get your business, blah, blah, blah. And it's all free. Well, most of them are free. So all of them. Then they'd bring outside speakers. They might charge you like 10 bucks, but um, yeah. So you have to have the mindset. [inaudible] so you're already ahead of the curve.

E. Appendix: Interview transcripts

- Interviewer: Did you also think like having your own startup when you took part in the programs?
- S_5: Yeah, though I wanted to do that years ago. I still do, but I'm stuck in school. The reason why, so actually I, this is why I said when I did the icore marketing program, it wasn't that big a deal for me cause I had already done stuff like that. I also had the same time when my interest in startup isn't related to my research. It doesn't make sense for me to take the university route. Um, you take the university route because you're conducting work that's related to startup on campus, which is the UC Irvine property. So if you have a business then it has to go through university route. But for me it was just an outside thing that I wanted to do. UCI was just kind of like a place for me to learn. Um, also my brother's a businessman, so I kind of learned from him on the side. Um, but yeah, right now I'm just stuck in school. There's no time.
- Interviewer: Okay. Uh, so you had the idea for the start up before you joined the Beall applied innovation programs?
- S_5: Yeah. Yeah.
- Interviewer: Uh, yeah. I also read online about the UCI research park. Uh, and I was wondering if the students are like extra involved with the companies there or if it's more just like, okay, they're next to university to
- S_5: mostly just next to the university. But if you're UCI student, if you're mostly master or PhD students who finished their degrees, they can apply and get jobs there. My sister in law works there. One of my friends works there. They're multiple different companies there so you can apply. It's just like any other company, they don't give you a preference because you're a UCI student. Um, but the good thing is if you want to stick around Irvine, the research park is a good area to look, but that doesn't mean you're guaranteed to get a job there
- Interviewer: Is there like some kind of interaction like while students are still studying like internships or projects?
- S_5: A friend of mine, he's a PhD in electromagnetics and he is working part time or something at Skyworks, which is at the research park, which is the same area where the applied innovation is. Um, it's convenient because he can basically bike there and back to campus. Whereas if his internship was a different city, you couldn't have done that. It's just easier. Yeah.
- Interviewer: Okay. And do you know why the companies are like trying to like be next to university?
- S_5: Um, well it's a collaboration, right? Um, actually some of the companies at the research park day. Basically they started on campus or the idea started on campus because let's just say you do research in optics and you do basic

E. Appendix: Interview transcripts

research. Campus is basically, it's all basic research. You do that and then you come up with an idea in your lab and then you want to commercialize it. So you take that and you've raised some funds like I don't know, a couple of million dollars and then you are free to go. Like if you're a faculty to go set up a lab at the research park, there's like university lab partners, they're part of the core innovation or you can get separate space and then you can start hiring people and manufacture the devices or whatever it is that you want to commercialize. So that is one aspect of it. So it makes sense to have something like this near a research university or every research institution. I think most of them have something like that. Um, also when you're [inaudible] come in there, you might get benefits, um, from UCI, like you rent the space, you rent office space, you rent lab space and maybe you want to work with research university on a project so your company for you an outside company but you want to collaborate with some professor on some, it's just, it makes sense to have that collaborative environment.

Interviewer: Yeah. And you said that, uh, that it's, uh, did you have like some sort of part time [inaudible] jobs for students at the research park? Uh, is it more like helping or are they actually interested in what the students currently learn at university in for example current knowledge.

S_5: I mean it depends on what kind of student you are. If you're a PhD student, you're doing actual work helping out or doing bitch work or cleaning, stuff like that. Um, I don't think they would care to hire students for those types of jobs. So like the friend I was telling you about, he is doing his PhD in electromagnetics. Skyworks is a company that does, um, circuits and, um, basically it's electrical engineering companies. So what he does, he uses the same basic knowledge that he has from his degree and he applies it in the R and D department of Skyworks. So no, they definitely use them as like a good resource.

Interviewer: Oh, okay. Interesting. Yeah, because I want to like see more if companies are actually interested in like ideas students might have,

S_5: um, I mean it's not a research lab where you can have a brand new idea and then they're gonna start making it. Um, it's not that exploratory when you go into a company. Um, the idea is they've already established their product lines and they already know R and D they do and they hire these PhDs and master students because they have some level of R and D background, they understand theoretically they have backgrounds, so they just like regular company hires. Um, but if you have an idea, I think that's more of a research thing. That's more of a, you join a lab and then you implement that basic idea. You see where it goes from there.

Interviewer: Okay. So you developed the idea and then you try to find a company that might be interested.

E. Appendix: Interview transcripts

- S_5: Yeah. Commercializing. If you're a senior, um, senior engineer at a company, you can come up with new ideas, but I don't think like they hire fresh PhDs and then they're like, okay, take over our R and D. I don't think that's how it works. I don't know. It could.
- Interviewer: Yeah. Like do you have experience working at a company? I don't know. Like maybe in between PhD.
- S_5: No, unfortunately I was, I've been a student continuously. I've worked part time here and there but not really officially at a company and not at, um, at the capacity that like I would put it on my resume. So it is mostly campus-related activities like ITG is a campus stated activity. Um, so yeah, no, it's, it sucks being a student for so long cause you miss out on those types of experiences. But I'll start soon.
- Interviewer: Yeah. Yeah. That's why I was wondering like, if you get like any practical experience while you're still a student because otherwise you get so much knowledge but you don't really know how to apply it or like what to do with it.
- S_5: Yeah, I know. Um, yeah. Well, I mean it's just when you do a PhD you just start later I have to go and um, uh, yeah. Or you can, if you're interested in PhD, usually it takes up so much time that, um, the opportunity to work campus and get like industry experience. So if you want that, I would recommend just having a master and getting into industry because PhD mostly prepares you for an academic career and it's like, it's a waste of time if you're interested in industry and business. I don't think it's a good use of your time if you're not interested in academia.
- Interviewer: okay. Yeah. But is it common like in California to do like summer internships?
- S_5: depends on the field. If you're in computer, um, there are certain sub fields in engineering and computer science that almost every summer they do an internship. Um, they make good money, they learn something new and the they, um, network, um, and then they have the opportunity for full time hire after they finished the PhD. But like in my field, not many people do that barely in biomedical engineering and materials and chemical. Typically PhD students stay on campus or in a summer and just progress their research. But computer science, computer engineering, um, electrical, even engineering, some feels like they have summer opportunities.

E. Appendix: Interview transcripts

Interview SI_1

SI_1: You tell me what's the thing that you need.

Interviewer: So can you give me a short summary of what you're doing at business Sweden?

SI_1: Yes. So I work at Business Sweden. I've worked at Business Sweden for three and a half years. So I started out as a global trainee. So, which means that I was, uh, sort of, uh, I was first based in Paris office for half a year and then at our Dubai office for half a year. And then I made the final transfer to, to London, um, two and a half years ago. And I've been stationed there since. So what we do at Business Sweden is we have two, uh, two purposes. So one is to support Swedish companies to grow their sales internationally and, and to, uh, uh, to help international companies to invest and grow in Sweden. So I work mostly on the, on the trade side, so I support Swedish companies, uh, that are trying to expand outside of Sweden, uh, and mainly in the UK and Ireland. So the focus areas for me are energy and smart cities. That's what I do most of the time. So I do different consulting in finance mostly and promotion assignments for a couple of months.

Interviewer: Interesting. Yeah. And Per told me that you like worked together with first to know when you were still studying here in Gothenburg. Um, and I was curious, like how you collaborated with companies while you were still a student?

SI_1: As a student in general or when I was doing this with first to know?

Interviewer: um, both, I guess because I'm curious like to compare what first to know does also like with other collaboration methods

SI_1: So which program are you, are you doing? You're doing the same as I did like innovation and industrial then?

Interviewer: Yes.

SI_1: Oh yeah. I think as a student we've had a few, uh, two collaborations with, with the industry I would say. Through the program, we've once had a collaboration with Volvo. I think that was probably, uh, you might've done that as well. Um, so basically, uh, everybody was divided into different groups and, and we tried to be innovative basically within, uh, within a certain certain given, uh, criteria to deliver on. So basically Volvo in that case, they wanted something that, uh, some sort of innovation that they could develop and they want some input from students, basically. That's what we, we gave. Um, and then I think the winner got to go out to Volvo and present it, uh, which was a nice product, but, uh, otherwise I think, um, there hasn't been done much collaboration, uh, between, between the university and, and companies except for when people are writing their, their essays. That's mainly, uh, so I think we did during the bachelor with it some others as well that we, uh, where we tried to, yeah, try to learn from,

E. Appendix: Interview transcripts

yeah, we just did short studies, like some companies, but, but nothing really. On the other hand, during my bachelor I did, uh, with a couple of other people. We founded a company, which was basically, which was very trying try to link the students and workplace. So we started a company that was called H F E K . But, uh, but this, this company was sort of an accounting company and we, uh, so we hired only students, uh, to do accounting for small and midsize firms. Uh, we struck up a partnership with together with Deloitte, so everybody got training at Deloitte as well. Um, and then they could hire from us, like, uh, coach staples, and they were put those things to graduation. So that was kind of the, the idea, uh, people could get quite cheap, uh, accounting, well the students got to practice their, uh, knowledge and also get like a foot in with Deloitte.

Interviewer: How did you get the idea for the company?

SI_1: I think we had a, we had a drink. No, but, um, we, we were actually, actually, I think we all, we all got to meet when we're doing like a ski trip. Students' ski trip. So that's where everybody got to know each other and then we just started talking about, I mean, if you are studying business, then we should start a business. Everybody was interested about it. So it just came about as an idea. Um, because I think at that time we were studying accounting ourselves. I think that was kind of the end of the thing. Uh, but it makes sense. And uh, I think the company's still up and running. I, I sold my share many, many years ago.

Interviewer: So it was that successful that you actually had like shares and like it continued on.

SI_1: Yeah. But I'm not sure I how, how's it going nowadays though? But it was good. And um, yeah, so I guess that is a bit of collaboration. Then obviously with first to know that was a little bit like, you know, Matix students. That was a part of our study that we looked into. Um, so do you know the my Matix program, right? Yeah. So, our study, uh, we looked into the university industry collaboration basically from looking at a few, few different, uh, perspectives. So, uh, basically we looked at it from, from the student's perspective, from the university, from the university perspective, and from the um, company perspective. What wants to get out of the collaboration and what they actually felt that they were getting out of it in the end. So, uh, so that was, it was, it was an interesting side of it. Then we looked at two different types of collaborations. So both, you know, um, or especially we looked into the Matix students program. Cause you know every student has been at a company that they work with for a longer time throughout the year. Then they also do their, um, their final essay in groups or something like that. So we studied two modes of collaboration for the Matix students that they had with companies. Um, and the, this is, uh, yeah, you can, you can find that also in the report. So, that's basically the only, uh, type of student, university, university, industry collaboration I have really seeing up close I think.

Interviewer: And that's how you got to know first to know?

E. Appendix: Interview transcripts

- SI_1: So First to KNow I got to know, that is a very good question. So I think it was, my collageue, my, friend basically, who I wrote the thesis with. He knew them. I stumbled upon them. I'm not sure actually.
- Interviewer: Okay. Yeah. And, uh, because you said like you founded your own company, did you have any experience with companies before you founded the company?
- SI_1: No, not really. I mean, we've, I think we all had to work before, but nobody had ever had their own company. Not started, but, um, yeah, no, so that was a, that was a work in progress. But basically all the, we tried to put as much from our studies into it as possible, which I think was really, really beneficial. So for instance, we have studied, you know, the basics of business law and these kind of things like what you actually need to set up a company. Uh, so having that in mind and together with, uh, with accounting and, uh, I mean, what you do is, it's actually less important maybe. I mean, they can always try to come up with your business idea, but kind of failure is not gonna fail, but uh, but just, but just that understanding and actually practically, uh, doing and starting a business or a corporation, it's, uh, it was, uh, I think that was very, very useful to have done.
- Interviewer: I also try to figure out if students are already innovative when they like when they are in university or if they develop that like innovative thinking when they collaborate with companies.
- SI_1: Yeah. Uh, I think, I think students are, I think most people are innovative. It's just that, uh, you have to like, you have to dare to be innovative, it takes just the right personalities maybe. But yeah, I dunno if my point of perspective would be that, uh, you can, when you work with companies, some, some people are going to be more innovative when they work with companies than others. Some people are probably not even going to be innovative even if they get the opportunity to collaborate with companies. I don't know if it is a prerequisites. I think it's more of a, an opportunity to explore that side of yourself. Yeah.
- Interviewer: Yeah. But what do you think is like the biggest value for students when they like already work together with a company while they're at university?
- SI_1: I think, uh, I should actually, I should go back to my old answers from my, my old thesis. Uh, no, but I, I think, uh, like the work experience itself is a very useful attitude to feel like, uh, you know, actually got some, got some work experience and getting an insight into, into how things work or at least how they would work in this context. I think that's what I would go with. Like the worst experience probably. We talked about the student perspective in my oldr report.
- Interviewer: Since you joined business Sweden, did you have the chance to collaborate with students?

E. Appendix: Interview transcripts

- SI_1: well me personally, not really well, well it depends. Yes, in a way. Yes I have. Okay. So in short we have, we have a few different types of students we come across. So especially when you are based in a foreign country it's a bit different. Different than if your basis is Stockholm. But uh, when we're, when I'm based London for instance, we do get visits from both universities and from high schools. So visits where we just speak to them and we'd like present and sort of what did we do went well the embassy do and what like, uh, basically just this is a potential future for you if you want. It is a bit of a discussion with them rather than actually collaborating. What we do have other, there are also some that do some internships. You could call it. Um, so we have, I have had one person for instance based in Paris and I've worked along with him alot, uh, he just returned back to his studies, but, uh, in any case, so we take students in like that, but we don't really collaborate with students on anything else. Like it's they rather work for us for a year or something in an internship.
- Interviewer: Okay. And when they are there for like their internship because they get like the opportunity to observe what you do, did you experience that they brought in like ideas on their own or like told you, okay, maybe you could improve that or you could do that differently?
- SI_1: Um, I have very, very various, like, it depends very much on the person I would say. Uh, but yes, I, I've definitely seen like good ideas and like very forward thinking and, uh, I've definitely seen that. But I'm also seeing, uh, instances of what would you say that when, when someone is a little bit, uh, shy almost, doesn't express him or herself that much because it's a bit of a scary situation. You're most likely much, much younger than everyone else and less, uh, a more junior and then to express your ideas that is always a challenge, but, uh, but yes, definitely when, when those ideas are being expressed, a lot of them are very good and it's always like, it's refreshing for sure.
- Interviewer: And like, because like if they do an internship, they're like, usually longer at your company. Do you feel like they developed? Like of course, like in the beginning you may be shy, but like that there, that the ideas were like better, like when the students were at your company for awhile?
- SI_1: Um, that's a, that's a student's ideas were better after a while then they were just in the beginning?
- Interviewer: Exactly.
- SI_1: yes. Uh, I mean it's always, always takes a while to get in, understand things, um, for sure until I understand how procedures and processes work. Uh, but, uh, so yeah, that's a clear yes.
- Interviewer: Yeah. And also like, what is your motivation to hire interns? Is it like, because they're like cheap labor or is it like also that they add like another value?

E. Appendix: Interview transcripts

SI_1: Uh, so the, uh, I would say so we tend to not hire interns at Business Sweden. We have to, we have done it a lot more in the past, but in London, we, uh, we, for instance, we don't do it, especially actually because of the, uh, the salary, which was kind of unfounded. It was like, would have been too little. Um, so, um, I would say that typically we don't, we don't do the internships ourselves, but there are two other programs such as the one in Paris for instance, that was true. The Swedish Institute, they had this program which was in collaboration with us in a way. So, so it's a bit different, but typically we don't tend to do the, those internships like that. Um, so I would say for cheap labor not at all. Not at all. Um, it would rather be to, to give an opportunity to the students. I think that would be the base. But, uh, that's also a difficult thing to do with some of our income coming from, uh, from tax money. Uh, it has to be spent in the best way possible. It's a difficult argument to make.

Interviewer: Yeah. But what do you think, like what value do the interns like add to the company? Like if they are there?

SI_1: Mmm, just like everyone else. Uh, they, they bring, they bring the value that they can. I mean, um, I think it's always, it's always good to have a good mix of age and diversity in general and that is one thing that they definitely bring. So if it's not, the student doesn't necessarily have to be young, but typically that would be, they would be, in this case, I would say a bit younger at least like the average person in the company. And also it might be a person that isn't as, in our case since we are based abroad, and might also be a person that most likely haven't, uh, been as exposed to that a bit more fresh, so to speak, to living abroad in that sense. Uh, which is also an interesting side both for them to, to, to learn like how that is and also for us to keep that in mind because all of our clients for instance are Swedish companies and Swedish people. So, so we don't lose that foothold as well. I think that's a good aspect to bring in.

Interviewer: Also before you said like that the interns had like different ideas. Is it more like incremental ideas? Like okay, that could be like an incremental innovation or like do they have like ideas about completely new aspects?

SI_1: So what we do most of the time is not so much we don't do products in any way. So again, I can, it's a bit difficult sometimes for, for someone to be very innovative, but how you can be innovative is basically how you approach different problems. And I think, um, that is quite incremental because you always build on something new. So I think it's difficult for someone, a student or so like come in to the company and then invent the wheel. It's already been invented like somebody has already done that. But, but for, for them it might be very innovative and might've been a while since somebody did it that way because we've moved on and started doing like maybe in other more efficient ways, but sometimes the old ways are also, it's a, uh, so I, I would say it's a bit incremental. They're like, they're going to reinvent a lot of things probably I think in our case because it's a lot of, uh, processes that are already set. I might be wrong.

E. Appendix: Interview transcripts

- Interviewer: I was also like looking at influencing factors of collaboration. So do you think like company size or like organizational culture has an influence on like if companies want to collaborate with the students or not?
- SI_1: Mmm, yes, yes. Uh, most likely. But, uh, there are so many different things that would influence it probably. Uh, also I think just, I mean, one challenge for us for instance, would be closeness to at least to Swedish students. So for Swedish students to come in or to collaborate a lot with us, that would be difficult because we're based in London. So I think also proximity is kind of silly nowadays, probably with all the solutions there are, but there's probably key at least, so it's more, it's more likely that the Swedish students from Gothenburg would collaborate with Volvo than they would with a, uh, with Scania because of proximity. So I think, I think that's also key. So once you take that into factor, then it's likely that companies that are also based and headquartered around cities with prevailing universities, uh, they are more likely I would say to, to collaborate with students and universities. Uh, so yeah. Uh, and you do definitely have certain sectors that are related to these type of universities as well. So Volvo, for instance, you have obviously both Handels and Chalmers, educating people to basically start working at Volvo. Uh, so there you will have a quite clear connection and so then, but then you're educating for that sector in general, which means that it could probably be, uh, probably going to form clusters around Volvo. So that sector becomes very important for university students collaborations or a university industry collaboration in Gothenburg. Um, but there might be a completely different sector up in, uh, in some other city, other university. So I think that it ties a little bit into like the proximity to that sector that is close by, that can be tied to the, to that university specifically.
- Interviewer: No. Yeah, I can imagine it's also easier like, because you can invite guest speakers or like, well Volvo has a lot of lectures at handles. So proximity is an important point. I'm not sure if you remember, but like, um, your collaboration with first to know because I'm also looking at like what first to know does well and like what they could do better. So do you remember like something that you like really liked about first to know or like something that they could improve?
- SI_1: Yeah, I remember I mean, I think, uh, what they're doing and the purpose and everything was really good and they, um, but they, when we did this, it was all a bit unstructured, uh, not our thesis work. That was fine. But, uh, that collaboration that they were holding between Matix and the different companies, um, this was a very, very interesting and fun project that they were doing. So they were having like these five, five students or something and they were like doing a project with a different company. So five students would do for Autodesk I think was in there for instance. Um, and Autodesk could have a problem for them to solve. They would work on this. Um, so lit is all a very good idea. I think it's, uh, it's kind of interesting, but it wasn't fantastically well organized. So being more organized and structured, that is what I remember that I thought that they should improve. And I think I wrote that into reports as well.

E. Appendix: Interview transcripts

Interviewer: Do you think it's useful for companies what first to know does?

SI_1: Yeah, I do. Uh, I really do. I think, uh, as I said, I think it's a really good thing. I think it has a good purpose and brings value to, to the students and to the, uh, to the, uh, to the companies. It's just a matter of, I don't know how it looks nowadays, but, uh, it just a matter of actually structuring it in a better way perhaps to, to make sure that there are attainable goals and that the expectations are very clear. I think that was a big problem actually, there were unclear expectations from everyone. So first to know was trying to handle everyone so they would promising different things to different people. I think that was a bit of a challenge. So I think just having everybody on the same page with like a, like a purpose and goal, a vision they shared, I think then it would be really great.

E. Appendix: Interview transcripts

Interview SI_2

Interviewer: I had a look at your master thesis actually and I had a talk with Julius last week.

SI_2: It was an interesting topic but we maybe made it a little bit difficult for ourselves with the quantity of interviews and everything that we did, but I think in the end it was pretty nice. Uh, it was definitely a good, good experience. And um, especially in just like looking at it from those different angles because we were looking at this program, this Matix program at Handels. And talking to all these different people. I mean we talked to a couple of uh, individuals within the school and then we kind of interviewed all the groups individually and all the companies that were involved. And then this is the first time I met Göran for example. Um, and these Autodesk guys, so it was really cool. Um, I know there was a question in here, something about like how much have you used it after I graduated, but like I couldn't really, I couldn't really find an example where I like directly used the results that I found out. But obviously like, um, when I was working with First to Know in those summer projects in Bergsjön, um, we obviously had, uh, we used a lot of the same kind of methods I guess you could say. So, uh, because we're acting in a little bit similar way with, um, first to know being the kind of the middleman or the facilitator between the students from Angered and, uh, the companies. So, uh, we, yeah, we used a lot of that kind of similar interview techniques or interview questions. And, um, so in that case, maybe I used it, but, uh, like in work, maybe not so much. No,

Interviewer: but like the summer space, because I also met with, uh, Tobias from Castellum and he said that students brought in their ideas and perspectives. Like did you feel like it helped you, the business context to develop ideas and,

SI_2: yeah, definitely. I mean, yeah, I was part of the, this kind of summer project or summer space or um, two times, uh, but it was a little bit different roles that I had. So once we had, uh, the university students came in and were kind of group leaders, uh, so, uh, I think that was the first summer that I was there. And then we worked with a lot of different ideas. Obviously the co the companies would come in either with predefined challenges or or questions or they came in just like completely open slate. And, um, I think that can help or be more complex for some people just depending on how they are used to work. Um, for me, I, I like to have quite, quite an open slate. I mean, um, where I can bring in the ideas and um, kind of organize it in the way that I like and then kind of present something. Uh, I know some other people maybe feel a bit more calm, comfortable if they have some structure or, um, like already defined something and then they can reorganize and make it a bit more clear in their head and then they send it out. Um, but yeah, we, we had a lot of, I guess good and bad ideas that we came up with a bit of was like, yeah, it was couple of weeks that we worked throughout the summer. So for example, with, I think it was with Tobias actually, that we, uh, developed some, I mean definitely not completely new ideas, but like simplifying because they have obviously a lot of difficulties with the language in Bergsjön, so many nationalities and they want to, things that they have issues with or had issues with a was the recycling rooms because

E. Appendix: Interview transcripts

people don't know how to read the signs or understand what should go where. And like the pictures weren't enough. Um, so we kinda thought of an idea that instead of, um, yeah, instead of just coming up with a big sign with all the different languages, which would just be impossible to do, that we would create a kind of, uh, index, uh, and using color codes. I think that's been used for a little bit. And finally in Bergsjön and probably even more wider, that column indicates which kind of trash goes into which, and then, uh, for one of the companies that was based out in Bergsjön, they had kinda, um, tours around Bergsjön, um, and it was kinda like a tourist thing. Uh, and they, and we came, she just had like basically no ideas like what to, how to improve or whatever. So it just came with a completely clean slate to us and didn't have any preface on what we did. So we kinda she focused a lot on like a walking tours with, with her getting stories and comments about Bergsjön. And then we suggested that, that she should focus on specific, like bringing in companies as a kind of a team empowerment thing. And not only do the tours, but also bring in maybe some like a food experience, like, because there's so many nationalities, so many people that cook food from all over the world, uh, to bring that in into, uh, into the idea. So that was a, that was pretty cool and she liked it. Uh, so yeah. Um, so definitely a lot of new ideas and definitely some ideas that kind of, we just took that already existed and just kind of develop them a little bit. Um, it was, uh, it was a really good experience to do work with Ola and Per and First to know. And like I did, I did all kinds of different projects with them and I got a really broad experience, I would say. Um, like project management, I learned a lot. Um, leading a team learned quite a lot and um, like even like interviewing people for the jobs or whatever, just like it was because they're very small, uh, and there's basically no process. Like, there's no, there's no defined process for you to, if you come up with an idea or if you want to do that or that, uh, there's no process for it. So you just need to, like, you come up with the idea and you define the process as you go. Um, so you get a lot of experience. You need to dig into a lot of things, you know, to do research and maybe you do it right maybe do it wrong, maybe you like, but you at least you learn a lot. Yeah. Uh, so for me it was, I liked it because I like working that way. Um, but I think for a lot of people it was very difficult. I felt it a lot from some of the students that came in like yourself, uh, that they would come and meet with Ola and Per and maybe me or somebody else and they would ask for or sent an idea or something. And then First to Know was like, Whoa, yeah, that sounds great and just go ahead. Like, but the students were actually waiting for some, like, this is what you can do. Like follow these steps and you'll be great. But there was none, and I don't think there's yet or still no. So like that's definitely something that I would, and I have told them that this is something that they can definitely try to improve for themselves. And for me, I mean, I was working there and, uh, it was very, economically not great to, uh, be just out of school. And because, um, well the project pay very differently, but depending on how much they like they ask for example, to be asked to fund them for a project basically, and then a student come in and bring brand new ideas and it's good, but like, it's very inconsistent, uh, financial Mmm. Outcome of it. So I would get very strange paid. Uh, so that's basically one of the reasons why I needed, well, I needed to leave, but, uh, I, I really liked working with, uh, with the processes and with students and with Ola and Per

E. Appendix: Interview transcripts

obviously. Uh, but I've been thinking like, eh, at a later point, maybe it's, it's great. It's a really good, um, set up that they are working with. Like they are doing a great thing. And I think definitely, um, they should check excess, but I don't think that they maybe need to be a profit driven organizations. Like I think they should more focused on maybe like working with the schools even harder to get funded by them. Just to drink, just to drive it out. Like just to pay like maybe some staff but not for profit organization. Why do you think that would help? Like not to be profit driven? I think it also would help with getting more companies interested because I think they're like, they, I think that that, that's where I saw some of the challenges come in, sorry. Um, when we were meeting with some of the companies and they were saying like, some all sounds good, but it's really hard for me, hard for me to tell my financial manager or just find the budget. I mean just to pull out some budget for something that is very, like, it's basically you're saying to your, uh, financial partner at the company, I need budget for something that we don't know yet because that's a lot how Per likes to work. He doesn't like, he doesn't like to predefine specific, um, projects or what should be an outcome more let's meet, let's discuss, let's find the challenges, let's develop together something that's going to help. But selling that to company like Autodesk for example, is extremely hard and it was just because Göran was here at the time and another guy who was at the time as well that they had some budget on their own. Like they didn't have to kind of take it from other, I don't know, other co managers or something that they could fund here at some point. Um, so I think if they, they could become very much bigger and even like keep staff, but like it would have to be somehow funded by Gothenburg university, Chalmers or Gothenburg city somehow, yeah,

Interviewer: But do you think that companies, for example Autodesk see the value of like working together with students?

SI_2: I think so definitely because at least that that's, that's, that's, that's the experience that I have from all the projects that I've been involved in. Uh, regardless of if it was me, myself in school in Gothenburg or, uh, me with first to know and all the students and the companies or seeing for example, Matix, uh, the program, it's, I mean the students are coming in and they are, I mean it just shows how easy it is for them to put theory into practice because I mean they, because that's, I mean, they go to school for a couple of days a week and then the rest of the week they work with the companies on projects and they like, they're encouraged to bring out of the classroom what you're learning and put it directly into the classroom because they need to obviously in some projects and then the companies are getting like the new theory at least. I mean, obviously I know something, my manager knows something, but it's more practical models. I mean, it's not like we're reading the latest journals and journals or articles or so. So that's one thing. I think also also from experience, like students don't usually don't feel, um, let me say it like maybe, yeah, like scared. Like, they didn't just don't have fear to tell it as it is because they, they come in for a short while, they ask some questions, do some digging, and then they come back and say, this is what we found out. Like this is how we experience it. And maybe it's, it's a completely new vision for somebody who's, because yeah, somebody

E. Appendix: Interview transcripts

who's just too close to understand it or, yeah. So I think at all points it's valuable to bring in students. I mean, I think it was for the Angered students. I mean they're obviously quite young. For them it was, they could definitely bring in some type of, uh, knowledge like experience. But I think it was a little bit also turned around, uh, there that we wanted to give them the experience to be able to make connections with companies and do real work and real theory and real research, uh, work. Uh, while when we worked more with the university students, it was, uh, that the students were bringing much more kind of on hands, um, topics and really good ideas to the table.

Interviewer: So you had like the high school students and their project also university students?

SI_2: So when we were in Bergsjön, so it was Ola and Per and then we had, uh, four university students, uh, from Handels adn Chalmers and, um, the design school. And then we had a big group of, uh, high school students from Angered. And then like, usually it was four, uh, high school students, one university student leading the group basically..

Interviewer: Yeah. I'm also like trying to figure out like if students are already like innovative or have that kind of mindset when they like start working with companies or if they develop it like during the collaboration, if it like helps them.

SI_2: Hmm. I think it really depends. I think there's a difference. I mean, it must be somehow based on background and just like what you're into. I think somehow, um, for myself, I think my, in, uh, in, uh, yeah, my innovative thinking developed much more here in Sweden than in Iceland. Uh, and that's due to the amount of big projects that we were able to do with companies. Uh, I think in all my bachelor years, even high school, um, we had a lot of theory, it was so much theory and if there was some project that like could have been done with a company, it was up to ourselves to like find them and start to work with them, which I mean, for our high school students or for university students, maybe it takes just too much time to do it and get it done properly while here in Sweden first thing we did, we came in and Rick middle like invited us to go to Volvo and start different projects with them and blah blah. This is like, Whoa, like, that's nice. So there's definitely, and I think it's the same for even the, I mean the bachelor students here they have a much closer somehow cooperation already with, uh, with companies at an earlier point and it facilitates so much. And I mean, and that's what I think First to Know also wants to do like facilitate and make it easier for this connection to happen because it just, it, it's only beneficial for all I think, but like, um, but I can't, I can't really like say, or I don't know if students are innovative already or if they come into project or if they develop it with the companies. I think, I think it depends maybe on the background of the student itself and then also on the project or, or the cooperation that they're doing with the company. Um, like if the company says, here's the project, here's a challenge, um, you can come to a meeting with me this time and then you can just present, uh, maybe it doesn't, I mean, it doesn't change that much for the student. They don't get that much too much to work

E. Appendix: Interview transcripts

with. But, uh, I think here when the students, the Matixstudents that were working here at Autodesk. Um, I mean they, they got a chance to sit here at the office on, uh, during working hours. So had access more to the people working here, had more access to maybe, I don't know, feel inspired or something from the company. Uh, and I think that definitely can help. So if the company is more open to bring in the people and like help them to, to, to grow in that, in that sense, I think that definitely helps with, uh, becoming more innovative. Yeah. Because if you, if you're doing a project and it's the only difference is that you're getting a project from a company than from your teacher than doesn't really change your way of thinking.

Interviewer: You mean if everything is predetermined. Just following instructions? How was it at Autodesk, the matix students id they just observe or did you like tell them, okay, concentrate on this topic or?

SI_2: it was before I started here, so I don't actually recall exactly what the project was, but uh, I know that it was sitting here like three days a week, uh, full working days. They had access to Göran. Like he was really, uh, helping them. And then at the point there was also an intern that was kind of just assigned to them as a support or something like that. I, yes, I don't recall what the exact project was, but it was, um, they developed some, uh, process or something and delivered a really like nice report and I think everyone was really happy with it and like inspired the wall as soon as coming to come in and do this in couple of weeks. It's pretty impressive.

Interviewer: Do you have any collaborations with students now at Autodesk?

SI_2: I think here in Sweden we do like the, it comes probably once a month or so, uh, some emails to the, the whole office, like is somebody, uh, able to do an interview with students or something like this. Um, like bigger, longer projects I haven't seen for awhile actually. Um, but we have summer interns every summer, but it's, um, um, it's more in the U S some of them are here in Europe. I think some of them are in the Munich office maybe, and then probably some in ACR. And, uh, they like usually comes out like in September some email. Like this is what they did. And it's like, just a bunch. Bunch of projects they worked on is like, some of them are technical, some are design and some are like more HR related and sort of like, they're just doing more or less everything. So that's really cool. Um, uh, more what I see now, like the, in the maybe past half a year we have done at the office, like a one day workshops with, uh, minorities. Like, uh, like first we did, um, uh, that was high school students and then just girls in technology. So like, and we brought a lot of speakers in. Uh, had them do some projects and uh, like everyone would like some girls from the marketing here and the go. So working with, um, channel sales and technology like are all present in here and uh, it was cool to be working with them and they like, w like maybe first half of the day was more like trying to inspire and then, uh, second of the day more to, uh, give them some kind of project to for them to solve and like try to find some low hanging fruits that maybe doesn't really, uh, exactly help us, but like just gives them, inspires them to be interested in technology.

E. Appendix: Interview transcripts

Interviewer: So what do you think like on what does it depend if a company collaborates with the students? For example, other days, like before it was a bit more, now it's less.

SI_2: Okay. [inaudible] I think you need somebody who's like really driving it somehow. Um, like Göran was here at this company. I think he was, um, he was really into it and like, uh, really want to do, make that kind of difference. So he, like, he went the extra mile, even though there was some budgets or financial involvement and like he could fix it. But for me, like in my department, it will be extremely difficult to get some kind of budget to bring in a longer project if it was like financial, uh, related. So everything I do and want to do, it would be, kind of have to be my voluntary thing. Like just to help an student like for example, for you and other First to Know students, I always try to, uh, accommodate and do interviews and help in any way I can. But, uh, um, I don't know. I think, yeah, somehow it needs to be something that the company really wants to do and want to be involved in student collaborations. And if it's like a one man trying to drive, it can be very difficult. Um, so it's, so like if I would go to my manager, I don't think he's that much interested in it at all. And so I think it will be different, more difficult for me to sell it. And then if Göran was still here, then he like could drive it if and then he probably would drive it more. Our CEO is a, he seems to be very interested in it, but like, yeah, he also needs to think about so much more.

Interviewer: So it's like not really a priority?

SI_2: I mean, yeah. Like I said at the beginning, like the education team was much bigger and it was much priority on it. I don't know. I don't know.

Interviewer: So students are not really seen as like a source of innovation.?

SI_2: No, I wouldn't say that. I would definitely, I would definitely say that they are, but it's just like, I don't know. I think the investment in time, and it's just hard to argue for if you're going to do it on like your working hours or whatever.

Interviewer: But like at Autodesk, do you like use open innovation or do you like try to go in this direction?

SI_2: That's a good question. I mean, we obviously we do a lot of work with the, a lot of the customers that we have, to try to bring them in and help them to help us to develop our products obviously. Like, uh, I'm not myself in any, any in any relation with the development teams of the products, but I know that like, um, when it comes to media and entertainment products, like we do a lot of sit down sessions with customers. Uh, and even for product design manufacturing, we do, um, kind of these open forums where we, we ask for feedback and input on, on the products that we deliver and if we can improve them in some ways and so on. But I don't know, maybe not that much open innovation to be honest. Um, in my department, I mean, I'm in marketing myself. Uh, and I'm

E. Appendix: Interview transcripts

actually with a marketing support team, which means that I'm a, uh, I'm a project manager for a couple of the marketers in Europe, they decide the, how the marketing campaign should look like, like what should be included in them. Like if it's emails or landing pages and social media, whatever. And then I make sure that it's all produced and designed and, uh, set up in the right timeframe. So they come to me say, this is a campaign, when, can we have it live? And then I go out and like involve all the production teams and so on. So like design for me or like innovation for me is, it would be more, um, will be more related to like how we simplify the processes of, um, executing campaigns like optimization, uh, um, uh, optimizations of some of the data bases that we have. Um, uh, some more like more technical things. Um, and so maybe not very innovative processes, but more, more, uh, "This is what we have, how can we simplify it? How can we reduce the time that it takes to get a new segmentation in our database or how can we, uh, remove some steps for the marketer to get a new landing page slide or something?". So that in some ways like, um, or incremental, uh, more incremental, uh, updates or like changes. No, not a whole lot. A whole lot of kind of completely new because I mean, yeah, I worked on this technology so um, things changed obviously quite pretty, but we rely on some specific uh, tool stacks that we use. So we can make changes within them, but new things takes, uh, yeah, it's, it's a huge investment to take it. Yeah. Especially if we're going to design something off shelves.

Interviewer:

I'm just thinking like if innovation would be a part of your job description, then maybe you had like more incentive, like to look for sources of innovation like students or initiate collaboration because so far for me, it feels like more charity, more like, okay, it's nice for us, like to offer students the opportunity to collaborate, but they don't really see like the actual like value, like why they should do it.

SI_2:

yeah. I mean, you're probably not wrong in that. Uh, and I think if it was possible to bring in more students, like if we could finance it or make it more easier to kind of do open innovation project or workshops with students, uh, on specific projects, I think we probably could or should. Because I think, I think students, I mean, even if it's, if, if you get a hundred ideas and one of them is pretty good, it's already quite a good thing. But I'm not sure how. So let's say, let's say that we would do that because we, let's say we have now, we have a lot of projects that we're gonna we're kicking off, uh, in the coming quarters and, uh, we are asked to assign ourselves to some of these projects and, uh, start working on them in different project groups. Uh, let's think if we were to bring in some students to ask for feedback, I think I'm just thinking how, like let's say that final show worries were no issue. I'm just thinking like time perspective. Like how much time would it take to organize a meeting with or even if it was online meeting, um, and get somebody into the state of understanding the, the issue and then supporting them with the work or the project that they're working on and then evaluating the feedback. [inaudible] that's basically what we do here. So yeah, something to look into. I mean, yeah, but, um, again, it depends on the manager to see the value in there.

E. Appendix: Interview transcripts

- Interviewer: But what do you think is the, like the biggest value that students can offer?
- SI_2: So if we think from the first to know productive that they can, if we do similar set up as a, as First to Know like you get a team of like cross functional students, let's say economic student and engineer and design student and something else. Um, you're getting quite a lot of knowledge in with what I already said with um, bringing the, the new fresh theory and maybe being able to put it into practice and their really honest feedback on like why, why are we actually doing this in this way? But then that's also an issue. Like the first thing that I mentioned, the being able to uh, create some kind of cross functional teams which would go into companies that always requires something like First to Know. So like for me, let's say that I wanted that and I didn't know First to Know, it would be very difficult for me to go to the university and say, I'm looking for a team of cross-functional students that can come in and work on a project basically tomorrow. Well maybe first to know has already. Yeah. But they already have quality students working with them and [inaudible]
- Interviewer: I also had some interviews with the university. They also said, yeah, you need a person at the university that's really like pushes it because otherwise, yeah. Like who can the company contact? Like who organizes it.
- SI_2: So, so this middleman or facilitators as first to know kind of, or is acting as is always needed and then it comes to how do they, how do they make themselves visible? So what Ola and Per have been doing in the past five years or so. It's all been through connections, at least to my experience. [inaudible] there. Like it was, it's, it's very hard to just kind of say here this is like brand yourself or like market yourself. Let's say we are a company that offers a great opportunity for university and corporation collaboration if they are continuing with financial issues, like they always want to, they, they want the companies to pay for their services obviously. But if that was out of the question and they could more just focus on doing what they're doing and doing it well, while they get funded by the schools or customer and that would simplify their tasks quite a lot.
- Interviewer: Yeah. Because that's also what I'd got as feedback. That first First to Know they don't really brand themselves or like they're not really known.
- SI_2: Yes.
- Interviewer: Okay. I think I've got answers to all my questions. More or less. Yeah. All right. Do you want to add something, maybe I forgot to ask? Or maybe back to you, like when you were a student, what was your motivation like why did you want to like interact with companies or work there? Or do a product?
- SI_2: To be honest, I think it was to create connections. Um, and then when I came to Sweden, we got all these opportunities to work with Stena line or Volvo, Innovation group and or, yeah, a lot of different companies. So, um, that

E. Appendix: Interview transcripts

obviously created a lot of, uh, connections. But then I also started seeing the value in how, how much better I understood what I was learning when I was actually trying to apply it to a situation, which was usually real or at least a made up case. So, so that's a, I think that's what I was. So connection is definitely number one. And then, uh, the benefits of converting theory to practice.

Interviewer: Did you have ideas before you like work with companies or was it more like, okay, you developed the ideas while you were looking at the company?

SI_2: Sorry?

Interviewer: Did you, while you were studying or like, Oh, I have this idea that companies could do better and like that you wanted to try out at a company or was it more, okay, you go to the company, you have the project and then you see like what you could do.

SI_2: Yeah, I think the second I'm not a, I think I would've wished, I was more, innovative and creative. So, because maybe then I would have my own company by now. Uh, so, Oh yes. But I, yeah, I think, uh, more of the innovation came when we were actually trying to just brainstorm on a problem or challenge.

E. Appendix: Interview transcripts

Interview I_1

Interviewer: What's your experience from collaborating with students?

I_1: I love it, that's the first thing. That's the first thing that Springs to mind. It gives me energy. I love meeting people, with different backgrounds, cultures. I am as far away from these extremists that want Sweden to be Swedish. As far as way from as you can from them. I think on the other hand, not an extremist. I think it's having worked for a global company like Autodesk, having run global projects. That's what I did. The last 7 years. My title was senior manager for global strategic projects. That was my title. I had a team called the method office and what we were doing work developing methodologies and building processes and tools to be able to be better at working globally together. What's the most difficult thing in a global company is to make sure that everybody, the information flow, how do you get people to know what's going on? How do you know? How do you make sure that they understand where to go, where to find information, who to talk to. During that time I always in every global project I did, I built a team that was global. So we had people from all over the world. And I realized after doing sort of having worked in global organizations that the more you mix and match, the better the outcome. So having people from different countries, languages, cultures, religion or sexual preference, whatever, whatever the more you can mix, age mix, try to find a mix of everything young, old whatever mix as much as you could. The better the outcome. Ten middle aged people like me sitting in a room and 10 people in the room with suits and ties you are not going to get the best out of it. You're going to get something really standard. But if you mix everything, if you mix every sort of, the input you get from all these people the end result is always going to be better than if 10 middle aged Swedish guys sit in a room, we're not going to be very innovative. So that's what I really liked with what I did before. So when I met with Per and Ola. Meeting with them coming up with, they came up with this project where we had an opportunity to not only work with young people but also with different cultures. Young kids with aspirations but not necessarily knew how to get around real life and these things. I thought it was a perfect opportunity and my manager at the time, he is no longer working with Autodesk either. We said if we could do something for these kids out there, this is the thing we are going to do. So we had like 15 people master students that were kind of semi teachers and then these young people, so we supported them with some money. but Most of all I think they liked Autodesk because it was a company in the front line, so we showed them, we gave them all the design tools they wanted for free. They had access to 3D printers. They could 3D print stuff. They could do whatever they had access to all the people that could sit in our office, work with us to get the inspiration of what is like working in a global company, meet people with different backgrounds. We had some sessions where we were, where some people were presenting what they do, what is it to be in sales, what is it to be in marketing, what is it doing this and give them a perspective on what the opportunities are in a big company. And many of these kids had parents that never had a job so they wrote what is a job what is it like. They had aspirations, I mean all of these people were the smartest out of these

E. Appendix: Interview transcripts

people out there, but they have, they didn't have the future didn't look that bright.

Interviewer: They were high school students in this project?

I_1: Yes. They didn't know. They didn't know what to expect. What is life like. That was very, very interesting. Also, what was very interesting to me was you don't think that when you're working like I do, I work with people from different cultures and realize that Sweden is a very small country. It's very small. Can we think we are so good? And when you all, when you realize that there are more doctors in India than there is population in Sweden, it makes you a little bit more humble. You are not the smartest people in the world. We have a situation that is pretty [inaudible]. Other people around the world don't have that. They have to work their asses off to get something to get even close to what I have for free. That's when you realize life is very, very different depending on who you are, so I felt that I knew or I had a feeling that I'm not very prejudicious. I can accept everything and I, when I see somebody, I treat everybody equally. But when one of the ladies were sort of dressed from top to toe and covered, you could only see her face, one of her hands, it felt like what's in there, right? What is behind it? You had the prejudice, she's very suppressed and so on and so forth. But here's a fantastic story. So the first we had been out there giving presentations, we had been giving them software and then we invited them sort of a few days at the office we would show them the three D printer. This woman had been working all night at home with her three D software. She had never been working with software design software before. She had designed a ring for herself and she was the first one to print. She was dying to get these things going. I didn't think that would happen. I thought she was suppressed. She was very quiet, but inside that was enormous. I almost fell in love with her. Wow, this is so fantastic. I mean, having a wife from Iran and staying in Iran for many times you see these women that are covered up, you feel sorry for them, not for my wife she is strong but for many other people you see. But you realize many of these people you see sort of behind the curtain, they have a very strong passion inside. They just don't know how to get out of there. So, so this, this woman, she had a, she will, she will be a lawyer. That was her decision. We had a guy came here, he had no parents. He came from Africa. I don't remember exactly where. And he said, I will either be a president of my country when I go back or I will be a professional football player. And everybody was, and I was thinking what the hell. If anybody's going to make it it is this, this guy. And after he left, I met him in the Avenue like two months after he had his first job. His English, no, sorry, his, his English was perfect on the beginning, but his Swedish. He was almost flawless in Swedish. It's like, wow, this guy has such a talent and now he is, I don't remember. I saw something on LinkedIn. He has moved somewhere else in the world. He had all sorts of things going on. I wouldn't be surprised if he would be president of this country. I think he will be. He has the spirit and the glow that you find very, very seldom if you have the right, if I were work at Autodesk and he had the right to education I would hire him immediately.

E. Appendix: Interview transcripts

- Interviewer: that's what I read about in some articles that when you work together with students the employees become motivated because they are driven and passionate and want to do something new.
- I_1: Exactly. Everybody just loved this project at Autodesk. They just thought it was fantastic. Meeting all those people. Prejudice again, realizing that you don't think because you're working with at a global company, that you you don't have prejudice. But you are. So that is why we have problems in this country and in your country. It is not very good and that's because people are afraid there's this 1% that screws up for everybody else who rob and kill and do all sorts of weird things. They have probably never been outside of the country. They probably haven't had a decent job and they blame the foreigners for their situation when it's really, it's all about themselves, I don't know if I'm, if I'm deviating from the subject.
- Interviewer: Did you have any other projects at Autodesk with students like master theses or any other?
- I_1: Yes I have, one of the people I hired was a master student and they did a master thesis based on a global launch project that my team did. Me and Bill. The guy that I said you're going to meet in the U S. So we had a project called the global launch. So the goal for that project was to launch all Autodesk because they were launching sort of every week there was a new product launch. It was such a mess for people to understand what's coming, what is not coming, when is it coming, who owns it, you know, all of these things. So what we did was to set up a project that made all Autodesk products launch the same day. So we set up, we set up the day, we set up contacts. We had a global virtual team, more than 50 people working together, meeting on a weekly basis in conference calls and so on, and people where we have special reports that they have to update on a weekly basis to make sure that everybody understands, okay, what is coming, when is it coming, what does that look like? Where can I find it? Who's who owns it? If there is a delay, when is that? Everybody had all the information at their fingertips immediately and that project was really successful. We did that for five times, five years, and that's what led to the method of this eventually there was a successful way of running projects, so we said, look, we can run this project. We can work on other projects based on the same idea, basic idea, but this project, we talked about the master's students. We had two master's students that were interested in, we were actually just putting it up on a master thesis. There was some sort of site where we published, here's what we would like and by coincidence the same day they're looking at it and called us. Hey, this is what we were looking for. Unbelievable.
- Interviewer: So they had the same idea?
- I_1: Exactly they wanted to do something like this. So they analyzed what we did. What is driving people to want to do things like this and the findings we had were many different findings. Some of the key findings were that people are motivated by, if you're based in Italy, if you're based in wherever you are based

E. Appendix: Interview transcripts

to to see the bigger picture, to be involved in a project like this, working more harder than you do before without any extra pay or anything. The benefits for them was, okay, I can see I can meet people across the globe. That is very important and I can see how Autodesk this company operates in a bigger, bigger picture than not just in my silo where I am. Get friends to expand my network and I also can see how you can run a big project. How do you run a project like this? This is bigger than anybody has ever done and if you have an aspiration of being a good project manager of some kind, this is a perfect opportunity to learn how to do something like this, so the drivers were, I didn't got anything to do with salary or promotion. That was a side effect. Many of these people were getting new jobs because they were all of a sudden they could be seen by the entire world. This person has a talent I didn't know hey had. That is very, very interesting.

Interviewer: So what do you think is the value for companies to work together with students?

I_1: To get, even if you're a big company. Working with students, is that you get an insight in what's going on right now. I'm very afraid of getting stuck sort of being an old man, always thinking that what I do is the best, it is not. Young people have different ways of looking at things. You know the discussion about X and Y and millennials whatever. They think in a different way, I want to be able to, when I was doing that I wanted to to be able to hire good people and one of them or one of these two master's students actually I hired after, okay, so we were working together for five years? And when I, when I was, before I left actually I started off doing something else. That's why and [inaudible] organization and then she went somewhere else and she was not happy there. So now she's working for one of the resellers, she was working for one of the resellers for a while as a marketing manager and now she's working for one of the distributors. So she found a career outside as well. And we are still in contact and her way of thinking is really good. I'm still her mentor. But jeez, as any mentorship you get as much out of it as a mentor, as the mentee. It doesn't matter. Both gain from it. And then I also, I also like being with young people, I really like spending time with people. I like spending time with old people but young people always inspire me, see the happiness and sort of the wish to accomplish something. If somebody is really into, I am working with a team of four girls I do presentations at an organization here in GOT, I'll come back to that. I was giving a speech right around the corner, there was a high school, I was giving a speech on leadership and the four of those girls they told us, told me that they were doing a, it's called young entrepreneurship or something like that. It's kind of a, yeah, one of the topics that they are studying. So they start their own company they have now and these four girls were really exciting to work with or to listen to because they had a great idea that they wanted to realize. That was really cool. And a few weeks after they called me and said we'd like to be our mentor, would you like to help us in this project? So I've been meeting with them two or three times, giving them feedback and now their project is, first of all they got highest, highest grade in school. But there is also a competition. So they were selected the 20 other, the 20 best in this region here.

E. Appendix: Interview transcripts

Yeah, exactly. And now three of these 20 are going to come together and come to the actual final and I hope that they will be at one of these three. I think they deserve that. Their ideas. It's really cool. It's a calendar. Yeah, and there's a lot of focus on food these days. So their calendar is can combine sort of the idea of food calendar and food and recipes and a QR code. So every day you scan your QR, you'll have a new page on the calendar and you scan the QR code and you get the recipe three. It's really, really cool. It's really nice. And so they have, they have reached break even even now they are making money to actually produce it and they send it so they are making money. Right. The last time I met with them was, and they were, that they wanted my feedback on their presentation. They had, I made a presentation that they were going to give. I think it was like the last Thursday that's going to lead to whether they get the one, two or three position. I think they are they are much smarter than I was when I went there and much more brain. That's why I was a little bit more shy. They were standing up in the middle of a cafe giving their presentation. Can you give me the presentation? Then they just stood up and gave the presentation. I would never have done that. I always, I always had a knack for hiring people. 3 out of the 4 I would hire immediately if I had the opportunity because they have the right mindset, the right spirit and so on. None of them is going to go into marketing. I will never, I will not hire them . Maybe I advise somebody else but we'll see. I have a few more years before they are ready to school. They certainly have potential. Three of them have great potential.

Interviewer: That's also like part of what I want to investigate. So if university students are already innovative when they like start working together with companies or if they develop this kind of mindset when they are working with a company.

I_1: No, I think it's something you have , you bring it with you. When I hire people, I usually hire them when I say hello in my mind, I hire them. I come up and say hello and I looked in the person's eye and I know whether I'm going to hire that person or not. It's going to be waste of my hour. Because it's, it's something in there that you see already when you meet somebody. If this person has potential or not. I cannot put the finger on exactly what it is, but there is something in that person's mind or mindset. The way they talk. I've only hired one person, my gut feeling. Then when I hired that person was, I'm not really sure. I'm never going to do that again. I'm not going to be in that situation, but many other people I hired, they have been working for us or some of them will be 20 years. Lastly, the last guy I worked with, I actually hired and he became my manager. It was a good talent. He came right out of the university.

Interviewer: But do you think you can build it, maybe it helps you when you're in the company?

I_1: Yes you can. It's a lot about your manager, it is a lot about about your manager. I just have to show you. This is one of the best, one of the best quotes. Let me think. It is worthwhile. I am connected o a consulting company and yesterday we had a had a team meeting. This quote. It doesn't make sense to hire more people than than tell them what to do. We hire smart people so they can tell us

E. Appendix: Interview transcripts

what to do. So I, my goal is when I hire somebody, they need to have a complimentary skill or be smarter than me. I'm not afraid of hiring people that are smarter than myself. I think that's a benefit. Obviously one of them were because he became my manager. I had a great relationship with him. I didn't mind. It was the best thing that could happen to have him as my manager. So we were working together for five, six years. He had a parallel career. Eventually my manager got kicked out and his manager got promoted, things like that happen in a big company with 10,000 so for me it was not a problem because I knew what this guy was capable because I hired him and I've seen him throwing something in his lap and saying, this is impossible. You can never fix this. That is the thing that got him going. That's the kind of spirit you want. So if you have a manager, when I was working at Autodesk recently one of the people I worked with had when she was, she was looking for a new opportunity outside of the team. The manager she was working with or working for at that time, there was, nobody works for me. I work with people whether they are up or down, I don't care. But this person got really upset when she was looking for another job. That's the kind of mentality that will stop people from going or would make people leave the company because we prevent them from making their career. I've hired people that have come to work for me. If I can hire somebody that stays for three years, that's my goal. If they stay longer and I want them to stay, longer that's then I'm doing really well. But if they, if they worked there for three years, all you can count the people that are very ambitious and when you can not offer them anything more. Sometimes you cannot go any further. They have different aspirations. Then you help them to get something else in the company and some people have come back to me because they know I will help help them. They come back to me for advice and come back to me to work with me. They have come back to me being my manager. You know, all of these things have happened during my career and I'm very proud of that it doesn't matter if you have 20 years of experience or 20 days of experience, it is what you can bring and it's your, it's your desire to do great stuff. You want people who just do things, and one of them, one of the best managers I've ever had was a lady named Carol Barts. You can google her. She was the CEO of Autodesk many years ago, and I have two things that I would like to share with you relating to her. There are many things I could share, but she was, she was the most successful woman in those days as a CEO in the IT industry, she was extremely successful. So I asked her, I was at the marketing manager, but she was coming here to meet the press. So I was setting up these meetings and one of the things I asked her was why did you join Autodesk which is a very small company compared to where she had worked before. She said she saw the potential for Autodesk to become a billion dollar company in five years. And then she got cancer. So she had, she had to go back and then it was a recession. It took her 10 years to make Autodesk a \$ billion company and then she left. Eventually I talked to her when it, before, just before she left, I said, Carol, you made it. So that was kind of her driving. And the other thing was that meeting where we had been with the press, I looked up at her, this is a very successful woman and I was very young and uh, after we had the first meeting with a journalist she came to me and asked okay how can I improve? What can I do better? And I was like how can I teach her anything? But she was sincerely

E. Appendix: Interview transcripts

interested in my opinion because she trusted her people to be smarter and come with different ideas. So I gave her, gave her something feedback and she said fantastic. Not all CEOs do that. Many of them are a little bit like, and the third thing that I learned from her, and I think it's very important is she had a mantra. She always said, fail fast forward. Okay, we are a company we are growing fast. Things are happening around us all the time. I'm not here to tell you what to do. If you've failed, okay, learn what your failure was. Don't ever do that again. But try new things and go on fast. Not, you're not going to be, you're not going to be fired because you don't succeed with sth, you are going to be fired if you don't do anything. Triple F fail fast forward. It's fantastic. I love her still and you know I just came into the the office in San Rafael one month before she was leaving and I met her at the reception and she gave me a big hug. This is a woman that is 150kg. That was a big woman. She gave me a lot of inspiration. I mean that's what is driving you, if you would have had a guy who always told you what to do. A good friend of mine he was the PR consultant for many years. He started working as a public relations person at a big company and he had his own company for 15 years, had been in Japan, in Tokyo and come back and he got this job as a communication expert for Assa and when he was going to be presented by the CEO, the CEO gave him a piece of paper saying, say, introduce it quickly, make it short and say something funny and tell that to a communication expert? It was like, he said afterwards to me what was I thinking joining that company. After that it was never good. This guy screwed up, Carol Bartz failed fast forward and the other guy don't do anything. I don't know if you're getting anything out of it.

Interviewer: When you worked together with students did they have ideas that you maybe also implemented?

I_1: Always, always. I don't, I don't tell them what to do mainly, I have an idea of what I want them to do. I want them to come up with proposals. It was difficult. Not difficult. It was different for that project with Per and Ola because they were so young and so inexperienced. But when I work, I want to hear what people want to do, I want to hear what people have in mind because they might have something completely different and much better than I have in mind. I always say to people, don't come to me with problems, come to me with solutions, so that's the same thing for the times when I've been working with students I say, okay, if you have this problem, what would you, what are the two or three different options that you think are the rights ones and why do you think these are good and which one is your favorite? And then we discuss that and maybe come up with a fourth one or maybe we develop one of them I came up with. Because if you always tell people I got this problem and I don't know what to do, I can always come up with a solution, but it might not be the best one. You make the people passive as well. I want people to be very active. You tell me what you think and then we can discuss if that is the right way or if there is another solution that we can develop out of something or could be completely different.

E. Appendix: Interview transcripts

- Interviewer: That is what I also want to investigate this collaboration aspect. Students have great ideas, but they don't really know what works in the real world. Like what do I have to consider?
- I_1: I said to these, these, these girls when they were going to present. They were starting to excuse themselves. We're not ready yet. We haven't done the whole presentation and blah, blah blah. But I said eh, eh, eh. Why do you start by excusing yourself. No, there is nothing to excuse yourself for. You explained the circumstances. You told me about the presentation. We're going to do it here on Thursday and we want your feedback. Of course you're not ready. So why do you start by excusing yourself? That's a natural behavior for many people. You know you're not perfect so you have to tell everybody you're not perfect. Nobody should ever. And I mean I think you are like that and I'm like that too. But if I can help them with sth it is not excuse yourself. Your ideas are as good as anybody else. In my meetings when I had my, my global teams and my, I was the marketing manager from Nordic, the UK, Benelux and Ireland we had sort of, I had a team of 25 people and then when we met. Everybody's idea is as valuable as anybody else. Everybody. So if somebody says that's a bad idea, no, you are wrong. It is not a bad idea until we, until we know it's about what you can not say immediately. Everybody has the right to have an opinion. Everybody has the right to talk until they're finished and no ideas are bad ideas until we, and we'll always have a timekeeper to keep the time on the meetings. Action notes, parking lot for good ideas that we really didn't have time. We had a mediator, when people started arguing for somebody who came in and was the mediator and we always had a bullshit stopper as well because some people including myself talk too much so we had somebody who could see that this is going off topic. To be as creative as we can be because we.
- Interviewer: it's good to have ideas because there's some people don't have ideas and then they discuss if it working or not.
- I_1: I also tell them if nobody ever has an idea, should not be working here.
- Interviewer: I am also looking at like what first to know could do better or like from your experience is there anything they could like add to their portfolio?
- Interviewer: How do you think, how do you mean?
- Interviewer: I don't know because from some interviews I heard that they are a bit uncoordinated.
- I_1: Oh yes very uncoordinated. But it doesn't matter to me. It goes with the territory. I think it's like they are chaos pilots. It is not meant to be perfect. Sometimes it can be annoying, but it doesn't for me, doesn't matter at all. I think that is one of the benefits with them that they come up with things. I mean they meet so many people, so many people in these hives where the people are like Chalmers and Handels etc of course they get new ideas every

E. Appendix: Interview transcripts

day. That's why I like meeting those guys because they always have something new that they know. It's not a bad thing. It can be annoying, but it is not a bad thing. If you want them to be structured, you can tell them. That they have to be structured and then they will be.

Interviewer: So what do you think the projects with students can generate that nothing else can create? What is the biggest value?

I_1: The biggest value is, is for the company they work for. If they understand, I mean they, they give you energy, they bring ideas that you probably didn't think of. I think energy is good. It is not necessarily, in these projects (high school students) it is not like we've got a million ideas from them but they came up with new stuff. Because they didn't have enough skills as there are in that age but when you come through with master students it's a completely different thing because then you have a deeper knowledge. The funny thing, I've been working in marketing for 30 years. I never read marketing anything, not one single line in my, I'm an engineer. That's my background. But it didn't prevent me from doing marketing. I probably thought about marketing in a completely different way than other marketers and I'm, I was more into project management. I hired, I hired damn good marketers and combined that with my knowledge of engineering. We made the best database, we could. I understood the value of things like project management, really effectively driving projects. That was something I liked very much. So I mean if anything they bring energy and diversity.

Interviewer: Master students did they come up with a lot of ideas?

I_1: Yeah. I mean, those master students we worked with, their job was to analyze what we did. Come back with feedback on what worked, did not work. What can be improved and what we shouldn't do again. So they came up with some really good stuff because when they interview people they can give different feedback than I did because I was leading the project, but they didn't say everything to me, but they told them. So the feedback about the project, the methodology, the processes, me as a person etc.. Because even if you encourage people to be honest about you as a manager, you won't get the full picture. It takes a long time until you will get that.

E. Appendix: Interview transcripts

Interview I_2

Interviewer: Okay. Like thank you for meeting with me. And like just as an introduction, can you give me a short summary of what you are doing at Atea?

I_2: Yes, I'm, my title or role is IT architect, but I'm primarily working with business continuity management and also business development and then towards the top management within our customer segments. And also my background and also stuff I am working with is digitalization in the sustainability context. Of course my background as well, our infrastructure data center, so I touched that area as well. Also at the moment I'm working with, with the high abstract levels of business, I try to move Atea more towards servitization and services and less from products and licenses and so on. So we are at the state of refining our, our offering to the market. We have a higher level of sustainability profiles. So prioritizing the, the sustainability leads and, and interests. That's also on my agenda, but for the moment I'm working with business development, trying to, ureach out to management more, uand be relevant and asks for in, in management groups and, and the, yeah. Leading management within our customer's organizations.

Interviewer: Okay. Thank you. And I know from Per that you worked together with students before and I was wondering like how your company collaborates with students and in which forms?

I_2: Well, I'm pretty new at the company I started in January this year, so I'm not sure, eh, I know that we have programs for collaboration with, with the Academy for sure. And in the perspective also have many in term intern ship sent, so on. But I'm not sure how it works. So I'm not the right guy to, to give you information about the thing. I, I know that we are positive to it. That's something to maybe came back to you later and give you a better answer around. So if you can drop that question in an email [inaudible] tried to keep you the right connection and address the question, you know, organization.

Interviewer: Okay. yeah, because like I'm writing my thesis about university industry collaboration and like the effect on the innovative thinking among students. So even if you haven't worked with students before at Atea [inaudible] do you have any other experience of what do you think why it could be beneficial to work together with the students?

I_2: Well, I have worked with students before so I have only good experience of that and I mean to be challenged and there are one way of, I think I need to be challenged and the Academy needs to be challenged as well. I think the student is, students are the best interface to challenge both of us. So it's I'll think the interest and the energy from students without any heavy backpacks, all the tradition and culture is one of the benefits I think and also the interest and curiosity from students is asking brand new questions. One really good asset when you are working with students they are asking new questions. Often we find ourselves asking and answering the questions in the same sentence we are

E. Appendix: Interview transcripts

so familiar with, with everything we are doing. So we would keep on answering the same questions over and over again. So we need new questions. That's one big advantage of working with students. And I'm of course they are close to the consumers and the users and that's always a need for the industry. To keep up with, with the, the markets that we are close to the consumers thinking and the users thinking and the demands as we told you in the meeting. It's a transformational power from, from the production line to consumer consumer consumers And I think that's obvious and I think your generation is pretty much already in that. I think if you don't, you don't buy because some from the industry say you should buy it. You, you have a need and you communicate your need. And you know where to find things. You know how to benchmark. And you know, how to validate the information much better than, than my generation. So I think this is already happening. So academy students more than professors and researchers are our assets when it comes to, to understand tomorrow's markets.

Interviewer: No. Very interesting. Yes. Yeah, like we are a different generation. So so you also, you said like the perspective of students is very useful, but is it also useful for you like the university knowledge of students to get this into your company?

I_2: I, I mean, the university old ways represent some kind of reflection and eh, odd society hopefully. And also have a established network of connections that also are useful for us. If we are, if we can use them in a, in a proper way, in a decent way. And also some of the forums that will be set up by the university. So we are invited, we we always have a good meeting place. I think, and also the, the the strive for always innovate and always, develop the mindset that is research and development is of core of universities. That's also interesting for us and, and needed. I mean, that's a lot of things, I mean relations networks of course knowledge, knowledge of the latest in technology and so on. That's also interesting and important for us.

Interviewer: I can imagine. Also because like I'm writing about innovative thinking. So does it happen to you that like students come up to you and already have ideas and tell you, okay, this is something you could do or you could do this better?

I_2: The interactions, of course their reflections are pretty new now and then, but as I work with students two years ago and the things in their thesis were recommendations and reflections of how to do things better, design smarter to be more simple, introduce more simplicity. I mean, yeah, I mean there's a lot of good things and off course coming from the students. And I mean I received from last time, I think five or six thesis around interesting subjects with findings and conclusions and good ideas. So, I mean, there's a lot of value I think if you, if you take your time and read it and listening. So yes, absolutely. I think also in the interaction, as I say, if you get new questions, you get new thinking. That is innovatio. You need to ask new questions to have innovative thinking in place. So that's for sure the process, eh, in being interviewed or being together in a workshop or, or a hackathon on whatever could be very interesting and very developing for us.

E. Appendix: Interview transcripts

- Interviewer: [Inaudible] Yeah. And usually like when you supervised master thesis do students come up to you with ideas or do you publish possible master thesis online?
- I_2: Eh, well, there are, as soon as the thesis is published, I mean, it's public domain and we share it all often in, in our society. So when, for instance, the students from Chalmers two years ago, published their research in thesis regarding an industrial design for edge computing applications, like data centers would publish it on the open compute network, a webpage, it's way of the community and share it with the industry as well. And also linked to that publication when we, because we liked it and we basically, we it was a great insight from them. And I know also some conclusions that absolutely will be applicable in, in and business cases so we share and publish if it's, if it's good to know, of course,
- Interviewer: And also like the the process. So do students usually come up with ideas and like with ideas that could be interesting to you or do you select students and give them a topic to write about?
- I_2: No, they drop some ideas. Maybe a couple of the master students last time I work with them have three, four subjects and we have discussions and I could recommend but at the end of the day they chose the topic themselves. But I say, this is a good thing, but you have to narrow it down. I could be some piece of advice I, I gave them. So maybe I have a better scope off through our discussions and the workshops we did. So sometimes they are really into something and, and also define their scope in a good way. So, but I mean some of my professionals, of course I can, I can, I can support but many of the things you are looking into could be academic as well. Are you at Handels or Chalmers?
- Interviewer: I am at Handels.
- I_2: Yeah. So I mean you're, you're working very, very close with the commercial side and business application side. Business canvas models should be one your say framework to work in I guess. And also the where you can create business cases and so on. So I mean that's of course something that could be one of the inputs of course. How mature is the market, do you think? And so on for this and also when it comes to our own developing our own offering and we, we could absolutely use aptly use some of the master students. Yes. So it's giving, giving and taking I would say.
- Interviewer: Okay. Yeah. Yup. What do you think, like why is it valuable for students to collaborate with companies?
- I_2: Well I, I think knowing for sure how what it takes to make business and be sustainable in this business. Sustainable and profit profitable. And that's an, an experience. They, they will get in touch with if you, they work with companies not in a negative way, but also getting a, I mean, a, a deeper understanding of [inaudible] is always the beginning, but also when you create a business, you

E. Appendix: Interview transcripts

need to be aware where all depends on who you are, who you are, who's sharing their experience. But my experience is that the social relation is, is it's a very, very, very fundamental core when you are creating thrust on a market. Could be one of the, the things that you could maybe grasp better if you work with companies and get in touch with companies when you are doing your, your masters. So, because I mean, I mean this, you'll, you'll have read some books in, in that subject on the university. But also I mean stories, storytelling from, from real life is, is sometimes a, another dimension for, for the students to, it is another way to grasping that reality.

Interviewer: Yeah. Yeah. You get the practical perspective I guess. I also want to investigate if students already have like an innovative thinking or if they build it while working together with a company.

I_2: I think probably they have a picture of innovative thinking when they enter the company and maybe it's being refined after awhile, working together with companies regarding specific ideas and, and yeah, projects. I think you have a picture of what innovating thinking is and then, and also what's what it takes to, to go the whole way from, from idea to product or services or whatever you are going to innovate. I mean that's a distinction between, uifferent people and different persons. I mean, innovating environments demands a high level of trust, saying what you are thinking and then because you're too afraid to get used. Yeah, you go, I mean that's the way we work, you know? But if you have a situation in the community, that very old man and very caring um, I mean innovating environments needs to be very lawful, not competitive, but, but I think you, you will have to gain a lot of innovation, energy and progress. You need to have a big amount of trust among the participants. So that's my, I'll say primary, uapproach and mindset. Create, ucreate the foundation of trust. So you can be brave in your innovate, innovating work. That's the best way to, to go forth. And also of course you have to be curious

Interviewer: [Inaudible] yeah. And it's probably like also special about students that they are curious and question things and want to

I_2: Dare to question dare just answer those stupid questions because this is, those are the one who will taking you forth, bringing you forward in your progress. I think students like to be innovative of course, absolutely. In, in the, and they need to be, I think pretty much questioning status quo, Disruption in a, in a, in a positive way is always big big drivers for innovation. I mean, not extreme revolutionary thinking. I mean disruption in a positive way. Maybe you have an idea, maybe you see this bad result, inefficiency, be a little bit disruptive and say "but if", and then you start to work. I think students have a lot of that. Also I mean an asset and a benefit of working with students. They question. I mean you have spent five years at the university questioning all the time, so you're pretty much prepared and trained in, in, in the, in these subjects. So still curious state of questioning. That's good. That's good.

E. Appendix: Interview transcripts

- Interviewer: Yeah. But like as I said before and, and probably the company also has to be open to that and like have like a company culture about openness that you are also like confident enough to bring up these subjects.
- I_2: Yes. you need to feel confidence in, in the, in the situation I think so. I think innovative congregations, communities are going to lead the future to be sustainable. Therefore I think yeah. Yeah. They're open. Innovate innovation communities are really important in, in this situation. When we are shifting from I will say one way of thinking like protecting fencing and patent to a more open source to society way of thinking. This needs to be business models needs to be changed because if you are going from protection of your whole patent into a more open source thinking. It's always your capability of communicating value. It's not the product itself, it's your capability of communicating value that will be the difference between you and your competitors. I mean, open innovation is faster, it's cheaper, it's more sustainable. And you, you, you, you can work with thousands of people that have the same interest as you have because we are so connected on the internet. We use Java. So you can work with people from all around the world, innovate if you have the core of trust in the community. So innovation is interesting things.
- Interviewer: But do you also use like students to move in this direction of more open innovation and like adapting the business model?
- I_2: I encourage everyone I meet to do that because I think that's the future as I see it. Yeah. If we are going to be sustainable and profitable and growing, we need to be open minded to open innovation, open source thinking and sharing. That's also a mindset. I don't mind sharing. That's a good starting point. And access before ownership is also one of the mantras that I am pretty sure pretty much sure it's going to be the next generation. So why should I own when I, when I need a resource I don't own, I need to use the resources, not own them. So it's, it's a change going on and I think that's my philosophy but I encourage everyone to take part in open innovation and try to figure out what is the good thing about being in an open innovation when you are your open sourcing and publishing everything you are developing. Interesting thoughts but I think, I think it's the only way of moving forward.
- Interviewer: Yeah. A your company, like how do you do that? How do you promote like more to be more open regarding innovation?
- I_2: I think it depends a little bit about, because I mean we are 7,500 employees in the Nordics and I think how you have [inaudible] and the as well, but if you look at the corporate code of conducts, values and so on, we are striving towards openness and sustainable living open openness when it comes to sharing.
- Interviewer: And could you like also imagine like doing a project like with students about open innovation? Like how you could promote it at your company for example? Yeah, we talked about like open innovation at Atea and I was wondering like what initiatives you think you're thinking about like to promote it more in your

E. Appendix: Interview transcripts

company and maybe if it student collaboration would be one way of promoting it.

I_2:

You know, I don't know because I think this is a good question and for sure I think we'll be fresh if we could have some, some workshops with students, but I'm not, no, because I'm not working with that area. I will try to help people. You'd be just drop me an email with a question. How do we interact with, with students because I know we do, but I don't know how. And have things, things when it, when it comes to open innovation, I think it's always a matter of maturity and time because when it comes to open compute project, you're aware of that. And with Facebook started together with Microsoft and Intel. So yeah, they are all developing open source hardware and for a market and in the community and they, it's a growing community at the end they are working with developing stirs, switches, directs power supplies. Yeah. You mention it at all that the infrastructure hardware for for IT. I mean Linux. Yeah. They've become the main operating system for, for all applications around the world. I think 95% of OLS is running on, on linux. This is the gangway for hardware. And when it comes to hardware, of course we have been working with IBM, HP, Dell, you know, every known brand and that has become our, our gold partners or vape. We are their golden partner. So this is very disruptive for a company like ours but the open compute project I mean IBM, HP, Microsoft disco, everybody's member, a member everyone except Apple which have their own own agenda but all the others are members and and participating in developing [inaudible]. I mean, there's so much power in this community, in this movements. So, I mean their order, they hear you call it stop them. It's, it's more a matter of how shall we deal. This year just giving you an example how we need to deal with open innovation and open source. Uhne of the main purchasing actors in Sweden that purchase for all public, I mean healthcare and municipality and government and the demand for this purchase they are doing right now they have open compute project and open serve as a deamand. If we are going to be a provider of that contract we need to be available. The laboring, meah, supporting open source hardware. And in that case we are a bit forced into it. I've been working with for so many years but I mean that's a matter of time. I say. So now a big purchaser of the public sector in Sweden says, we like you to provide us, if you like to be in this contract with open source hardware. This is what's happening right now. And you're not Huawei the company from China, they have all their, in their organization they have 80000 employees working with R and D eight eight zero zero zero Xero, 80,000 employees just dedicated for research and development. And they have decided to put every infrastructure for hardware in open compute project instead of doing it themselves. So that's interesting indicators because I mean it's much faster. It's much more cost efficient in a more energy efficient and environmental friendly. So the only thing, on the other side of the coin. It's open. You need to publish designs. Always. There are businesses providing uh, eco services, internet services and ITservices. They see that if we put in, let the open community develop our products and make open source them, that's, we don't care. We don't need to own them. But we need the infrastructure for our business. They put everything I, even though they have 80,000 employees working with R and D, they put it in the community. One of

E. Appendix: Interview transcripts

the reasons of course it's, you'll have access to the best innovators developers there is engage in the challenge of developing new innovating new technical solutions for the it industry. That's otherwise you have 80000 employees. Yes. That's good about you don't have the mix of engaged, curious, skilled people who's taking part of the innovation project. But that's interesting way of we'll see innovation now even though in pharmaceuticals and research on the medical side. They are open up projects now for for open innovation. You get the doctor and researcher from all around the world participating in creating new medicines and so on. So it's interesting.

- Interviewer: Yeah. Right. And so who is in these innovation communities? Is it like the different companies that work together?
- I_2: We have a great, I mean they our, our customers in the industry the the vendors the Academy, they have an open compute project now in San Jose. They have participation from 20 or some 20 plus the universities MIT is leading the workshops and they have exhibitions there. They have the posters, they have, I mean, they work a lot with the Academy and the Academy seems to be extremely interested in partaking in those communities. Yeah. So if you like to, to to see where they have done, they, they, they published a lot on their work, YouTube films and power points, and yeah, they have been working the last two summit, the one in Europe and the one before in San Jose you will have a lot of material from, from the Academy working in the open innovation regarding different projects and so on. That's a great collaboration between, I mean the customer, sitting together with the, with the producers and working in the same project.
- Interviewer: Yeah. And then you have a direct connection.
- I_2: Yeah. I also the academies there. So we have last time when I was working with it most students from Handels, they did a great job working with OCP, interviewing OCP members regarding data centers and edge development of the technical solutions for edge computing.
- Interviewer: So they were also investigating the collaboration in open source communities or what was it about?
- I_2: Yes they did so and they I mean you are welcome to do that because it's an open open congregation open community. So that's just the interesting body if you like take a closer look. Go to "open compute. R" I can tell you, I think it was symposium Academy symposium something and, you can, you can listen and look at the videos there.
- Interviewer: Yeah, it sounds very interesting. And do you know like if the students were involved or was it more like a senior researchers from university?

E. Appendix: Interview transcripts

- I_2: I think most both because some professors were there and had any speeches and has and lecture, so but also students leading some of the projects. I think probably different universities. Let's see. You have a, yeah. Future technologies symposium. They invited from all over, all over the world, but they have to close it down from China and Korea because of the corona virus. They've got a schedule for these academies symposium and so on. I mean just go there or organic and [inaudible] event and then you can do and find out what kind of all the innovation and participation that universities has has been them working with the companies and, and the, yeah. The public authorities are there as well, so I think it's a good representation from all the society.
- Interviewer: Yeah. Like yeah, a good example of collaboration between industry and academic academia. Yeah. I'm going to have a look. Yeah.
- I_2: Again, don't be afraid to interact and get in touch with them and you feel like getting names. I will kind of give you some good contact persons. If you take a look first, see something for you in your work.
- Interviewer: Yeah, great. Thank you. Yeah, I also prepared some questions about first to know, but as I understood, you haven't really worked together with them so far.
- I_2: Yeah, we, I, I have done the work with them and the things I refer to is my work together with first to know. And we are in that stage, we had I think as a total of five or six master thesis connected to the work with the, for developing well I'll say most one of the groups who was working with Chalmers did this great work with researching how the design and develop a modular data center to fit the OCP [inaudible] then we had four or five groups researching the market for us. Well their thesis, they looked at different subjects. For instance, one of them looked for eh, how mature is the, eh, TelCo market regarding the roll off the five G and one one is how does, what is the need for collaboration on the new market for edge computing. So they really were attached to our work to, to get a, I mean, a market research. Also look into to some new business model. Is there the a demand for new business model in this new markets? So the answer was yes and the stakeholders like Eriksson, Nokia and Microsoft and others. So we get a great job done there and have a lot of of input from the master students. So I have a great experience working with first to know. And they also help us with our some kind of change management, regarding our own organization. I think we have a lot of help from Ola performing workshops with our management and our board. And we did an assessment of different skills and, and, and still won't have to just see how the board was prepared to act on those new markets of edge computing and so on. One workshop we did and then another was how does the master students work fit into our market strategies, business strategies and where could we use those materials in, we have a lot of people engaged from our company together with the students and Ola has been the moderator in this, I think it was four, four hour long workshop. We worked together with them arranged by a first to know and the students were there and Ola was there.

E. Appendix: Interview transcripts

Interviewer: I'm investigating like first to know role, like in the collaboration. So when do you involve, when do you think like, okay, first to know could be helpful in this. Is it when you look for students, when you're thinking, okay, this could be an interesting project for a student, or what is the motivation ?

I_2: I think when you have some project needs to be done and you, you, I mean the, the, I mean the, the business idea for first to know is if you have, if you have a, a project, a challenge and, and I mean you, you really need to perform in a short period, let's say six months. They have the resources to put in master students, a very value asset, to create a team around this and perform a lot of good work, kind of a community that first to know can arrange with master students and other connections they have. And it's much, of course it's a good cost efficient and also in time you can work very fast. It's, it's like, I mean the open design thinking model that you, you are gathering around a company's issues and some of the thesis that fit into. It's the contribution that most of the way we connected. Hey, we need to do a really, really profound, uresearch around those markets. We have numbers here in the reports, but we really need to have the work done just to evaluate the market and the maturity of the market. That and also how to do business on this new market, And First to KNow said, yes, we can ask, ubecause we maybe have a number of students who interested in working in with the business model, with the research of the market, with some industrial design we could be contribute, uto your purpose. So I don't, I didn't know and I asked First to Know, how many students would be interested in working with us? Five, six. Interesting thesis subjects and headlines there that will pass through the, yeah. Uthe university's, uuapproval and the contributed a lot to the work we needed. For us, it was a matter of resources because we were a few, ht was only myself in the, in the business development role in that company. I worked for them. So we did not have so much people to work. So it was a great solution working with First to Know and the students.

Interviewer: Okay. Was it like just about the resources or did you also think the students could add like an interesting perspective to the topic?

I_2: Absolutely. They add an interesting perspective. Very interesting in that as well. Absolutely. And I think that's one of the, the benefits working with first to know. They have seen this in several cases that participation and they're, I mean they're there, they asking you new questions and that's very, very important. And also they are fresh in, in their mindset. So if there's, there's all a good impact from the student that we, you, you probably not get if you go to the consultancies and ask for these things to be delivered.

Interviewer: Mmm. You mean like in terms of new perspectives and ideas and motivation or what do you mean by positive impact?

I_2: I think exactly what you say and also the curiosity and they're also dare to ask questions. Not only provide us with things they think we like to hear. Asking questions. And I think there is just a good possibility hat they could ask questions that have never been asked before and that is maybe the most

E. Appendix: Interview transcripts

valuable thing they are doing. Of course they are doing a great job and putting a lot of effort. Usually read the report, write the report and also doing interviews and research work about also the questioning and have the energy of course.

Interviewer: And also can you think of anything that first to know could like do better or could add to their portfolio?

I_2: I don't know because they are, they are having a great network with them. They called us from the Academy and from the public authorities from the industry though may, Oh, I don't know. They have a way of working I think it's a little bit when you unique. Add to the portfolio maybe I think they have everything because they have the context with the finances and also when you're trying to do, to raise money for, for, for developing projects and foundations and so on. And they have a really good connections within Handels, Chalmers and, and they have great connections with Ericsson SKF Volvo and so on. So they have, I mean there are really a what do you could say a portal to, to if you like to access some of these areas you can do it through First to know, but I do not think they're promoting themselves that way. It's maybe they are a little bit low in the profile. I don't know. I happens to Ola since earlier and Per. So I think that was a good idea to, to approach them and see could you help us with that? Don't even know exactly what they were doing at that time, but it developed really well for me. So maybe they could be a little bit more aggressive in, in their, promoting themselves as a resource in, in developing the sustainable society or something like that.

E. Appendix: Interview transcripts

Interview I_3 (excerpt)

I_3: A lot of my employees. So they don't like it. They get a young person asking, why are you doing that? Why do you do it like this? Why you do it that? But I think that's the best way to get better, when you have to work on your, uh, when you, when you are actually challenged. Uh, when we have to explain why you think sometimes you actually understand that we do this because we have always done this. Not because it's really smart. It's not a, so in some senses when we are collaborating, we are looking for talent and we're looking for the collaboration with different companies as we do here as well. But I think the process when you are students coming in and asking, why have you thought about this? Not all the employees in my company, think this is really fun. A lot of them do ask can I not just do what I've always done. Do we have to, does somebody have to ask me every time I do something, why? But I think that's a way that you actually have helped organizations to see more perspectives. But because of course I cannot over time I can not change 50% of the employees every year that it takes three and a half years to learn that building. We have to have the people there that works. But could I make them get new perspective in order to to have you as injections into the company?

I_3: Um, I have no problem with change. Uh, most of the people do. People don't like change. They want to know what to do and, and, and, and you have to gradually ease in this of course, we cannot use students, uh, in, in a perspective that if I knew I have 10 people that definitely don't want to and I take one of you and just put you in an order for some use to rattle things around, that's not fair to you. O of course you have to know the organization and what people in your organization is ready for this. And, uh, otherwise there could be a situation that a lot of students say we have collaborated with Castellum and it wasn't that fun. Bn the beginning it was like, no. So I had to do a couple of things, uh, educated the person that's going to take care of them. He had a special education. I said, Oh, you're going to get a, uh, some type of a appreciation money-wise if you are asupervisor S

I_3: The value was that we we got people coming in really interested, really, really wanted to show them they want to be recruited by Castelum. So they did a really good job, but I could do this. And they also found out that I told my personnel to take all these papers that we have acknowledged and put them in our system. Are they been working on that now for 12 months? They're not finished yet. And when they got to young student come in and say, Oh, you have a system for this. I thought that was really cool. Uh, I could help out. But it took a person like that. It took them three weeks and they've done everybody's work because of they don't have these, uh, you know, it's not, it's not a strange thing with digital assistants. So now the area manager is like, yeah, I have a whole list of things. When you, when you give them to these young students coming in, uh, I will make sure that they have a good time learning different things because a lot of these things that they do, ilt's things that we should do ourselves. We haven't had the time to do, but it's also things that you do that makes you learn much faster than you do in school. Nd the thing is I want, I want to work with

E. Appendix: Interview transcripts

these different kinds of people with different kind of perspective. It's a way to, to attract talent. It's the way to find talent, but it also makes our company a better company and it helps my employees to meet these different type of people. Different point of view. People questioning what they do and it's not, it's not as bad when you question one of my employees, why do you do that? As when I do it the boss, now the boss comes. The threat level is so much lower.

I_3: Yeah, we do have this perspective as well and I, I've used a couple of students myself for ideas that I have, but I don't have the time to actually, you know, you get a lot of crazy ideas or, or you should look into is this possibility to do, to do like this. It's that the thought is not, as finished. So I cannot put it in the hands of our people that work for me. It's not as finished that I've wanted to pay a consultant in order to do some investigations on that, but I could go to Per and say, I have this idea of a more sustainable way to solve one issue that we have. And he said that would be a perfect case for a couple of students. We would need one with an architectural perspective, a business perspective, and a and a human behavioralist perspective. And he could find students that works on that case for me. So they take my idea from here to here and then it's ready to maybe go to the personelo I actually have sent a lot of students out to meet our customers as well, so, so they get the full perspective. We

I_3: They had knowledge that I didn't have .So it's a lot of different things you need to think about. And, and of course, uh, other people that may have, have other perspectives due to their experience, their way of looking at, But of course when we do new things today, the customers for that product is not, it don't always have to be the customers that are in the market right now. You have to have this idea. It could be great but don't do it in 10 years. That's knowledge as well because in 10 years you guys will be managers or different departments at different companies and then it's going to be spot on.

I_3: Yeah. Yeah. We have, we have the result of their, uh, their paper and a and what they said, the most things I actually learned was not from the paper, it was from the discussion with them alone because they, they came back and started asking me questions, more questions about my idea when they got more questions and then I get to understand what the company statement said and they looked at uh, similar things in different branches. Uh, so, so I increased my knowledge. I think the paper was really, really good as well. So we have it. Um, we haven't been able to set it yet, but we are working on a similar thing right now actually on the other side of this road.

I_3: No, I connect the dots looking forward and I'm doing it. But the same thing was when we started working with this totally before more students getting access to our workplace and all this. I made this plan and everybody was like, Oh no, we never, why did they have never done it before? No other companies work this way. I said, I want to do this. And of course I'm in a position in the company that I can force people to do things in order for me to connect the dots afterwards. Not in all senses, but in this sense I said, we are doing this. Not the people and I forced them to. And now we're only one year in. It went better

E. Appendix: Interview transcripts

even than I thought. I thought if we do this for three years and we have employed two of these, we can say we attracted the talent. And that will be my dots. That will be my storytelling. Now we are on, got one year recruited 5, and we can say also that we have people we didn't recruit that actually made things for us or did things that also helped us reduce cost by enormous amount of money. I heard that you were working with other companies, talks to the school and said, Oh, the best company of them all, but this is Castellum. So now they called me and said, Oh, could you come and tell us how you do? And I said, of course we share. Here's exactly how we did copy it. I don't care. They would still be number two because we were first and all the students will benefit from it.

I_3: Yeah. Yeah. That's why this was a really, really long sidetrack. But when we talk about innovation, that's why I said I believe that innovation has to be not only a cool digital thing or the new innovation is new ways, new solutions to old problems. Right, and of course we saw the problem when I talked about how we work with students there are side benefits, that they inject us, side benefits that we give more popular schools. It's a side benefit, but the main course is it's a new way to attract talent.

I_3: Innovation is a, and, and what's the most important thing? If you want to be innovative, it's not the high tech part of the company it is the culture. What happens within the company. When Daniel in this case said, I do my work, but I also really want to try and do one thing, they can save you all under that. How do the colleagues react? What do the bosses say? What do my colleagues say when I have an idea we should work with student this way. Oh, we don't have time for this. Or what do you say to Daniel, you are you trying to be good now the bosses love you, blah, blah blah. What did the culture of the company let people do? How do they, how did the company react when people come up with an idea, how do I as a high level manager react when, uh, when, uh, when an employee comes to me and said, I have an idea really good. I don't have the time to listen right now. Could you, could we talk or I said, great tell me if I think that you're bad. How do I react? What do I do? Well, I said, great, I love it when you have ideas do it. Even though I don't think it's good that this leadership and its culture.

I_3: O, but I will say the innovation force in that company in some, in some places really, really good in some places. Of course you have the fact that it was a municipality company, you know, never had that pressure to change. Uh, being there for a long time, only good years. I believe the bad years actually are with the biggest where innovations happen.

I_3: But of course the thing is that when you do that types of things, people are have to have to risk in order to innovate. And that's what I say in that organization. It depends on people that are willing to do it. Otherwise, if you're going to get extremely good at innovation, regardless of business, regardless of whatever you do, you should have a place that celebrates, uh, people should, who did do

E. Appendix: Interview transcripts

things differently. We'll find new ways to do. We tried that at Castellum West where I work today when people don't think that they don't already do or made a great deal or whatever it is, you celebrate them by giving them a small gift.

Interviewer: So do you also use student collaboration to break the pattern?

I_3: Yeah. But when I said injection, that's the same thing. If you come and you work we take it Valley, he is a cool guy is I think it's about 60 years old. It, fix the things in [inaudible] coming out in the door is broke, I'll fix it. If he were to have a student and said, well, why do you always take this route? Well you always do this, but if he, if he's open to it, he is, yes, but if it's, if you're open to it, that every time he also said you tried to think of the best way to answer it instead of always saying, because I always did that. You ask him now if he really thinks that, Oh, maybe I could take the other way. Maybe we could do it this way, that way. Uh, eject because there's that question, why? How can you do, can we do this differently? Could you do this smarter than when he always, every time you get something could it be cheaper, could it be smarter? That's what drives development. That's what drives development. And of course if you get people from the outside, some of the things that we do are really stupid, but we don't see it because we're doing it so long. It was, it was, maybe it's even a smart thing to do five years ago. So we still go around. I go around a few rounds. We do that because I was the one who came up with that idea 5 years ago But due to the things change, it's a stupid idea. Then you have to have someone say, why do you do that? Then I would say, yeah, I locked. Maybe I think that's a student perspective that if you, but same thing, if the organization is not open for that type of a, I don't know what you call it, but if you, if you're not really, I could be offended by you. People come telling me how to run business. Do you know who I am? You know how much money I make if I had that point of view instead of being really interested. Okay, how do you think, ah, I never thought of it that way. But the reason is maybe somewhere in between, you know, the best solution is, but then of course the person that you meet has to be open to it and not to be closed and have a lot of prestige and thinking they are smarter and better.

I_3: So I myself understand that I need to be in these leadership networks. So I joined leadership networks in town, uh, in order to get in contact with a lot of people, different companies. I need to be friends with them. I need to tell, I need them to have to know me, to like me and I need to tell them that this is different in order to get them to actually come out and see a different picture because they don't know people from Angered, I don't know, people from Bergsjön and I was from there and I don't know them, so I have to go that far. Uh, and uh, and I met people, I collaborate with some, uh, with some academics or professors and other staff would be interested in this social development. They said a lot of students interested. So I got a couple of connection and there was one guy at Handels I actually talked to who's really interested in, we want

E. Appendix: Interview transcripts

some prices and stuff and I'll get 50 minutes of fame, you know, for, for this and he went in contact with me. It was a network called SOCAP and I was interested in finding new ideas and stuff and he said, I have two guys you need to meet and okay, send him up to B because the other thing, and I never, they always want me to meet them in town. And then, um, it was, um, I think it was in the fall of the 15 or 14 or whatever that Per and Ola came and they, they talked about this idea with the summer space that we take master students and we, we make them product developers and we recruit. So I had an idea and when they came and talked about the idea of a summer space that we have students doing development things, I thought, this is really cool. Of course they told me they had other companies that they know that it's going to, we're going to try to do this. I didn't actually understand what they meant, but I'm a, I'm a gambler in some sense. I thought, okay, it's gonna cost me this amount of money in order to make this happen. Let's try, it hasn't been done. If it works, it could be the possibility for me. So I said, okay, I will pay salary for all the kids. The students from Angered gymnasiet they were actually my tenant's kids. Right. I will pay all them a salary. They're going to have a real job, has probably developed those for something. And we, we, and they [inaudible] they gather some money from other companies in order to pay their students from Chalmers and GU to be the in charge. Rio if for some sense the way for me to give the people that worked for me, something really fun to do as well. Good to do so. So we did the first time summer and we had a lot of difference. I had a lot of ideas that I wanted to do. I don't know, I couldn't find, I said, but let them sort it out and Per and Ola made sure that he came and made, made sure they'd come a lot of different company standards that we met. Wnd other companies said, we believe we're going to find these talent because we work in a multinational company. Our customers are from all over the world. And when we search for employees we want to get Swedish students from Chalmers. So we're here to find these students. We want to make them to come to us because they wanted to speak five languages. That's why we're here. We're here to hunt as I, ah, I love you guys come here because everybody could be, um, honest, but why they were there and I would say the same. I'm here to develop my quorum to increase property values. O think I spend a nine full days on my vacation and actually onsite when they were working, collaborating like this, the process, it was so fun for me. I had, I learned so much from these people and they gave us so much insight because they could talk to tenants. So either we couldn't, a lot of my, my employees were of course tenants as well, but still at that day they taught us so many things and uh, the people that worked from these thought is as a privilege. The one would be doing a really, really good get to be part of that, uh, the space. Then we started collaborating over the year, mostly students from, of course I got a flow of students, I think we were at 253 students in one and a half year. Do different types of projects, not only for us but in B, as a base for other companies. How do you grow in garages? How could you develop, um, uh, communication with tenants, these types of different projects they looked at and collaborated with us. We have floor people in there who also helped us environment. They saw B then, Oh, back when it's not a problem or you should add a great store area. So all these students in the future are gonna be leaders in different companies because they were like, you, you know, being educated

E. Appendix: Interview transcripts

in the best education. What is it that we have, not everybody, and some of them in the future are going to be leaders and they are going to say [inaudible] well, why don't we open an office in Bergsjön? O, that they found, they found business models there. I didn't see him. Yeah. So, so that's how we started collaborating and it becomes, a natural part of us to have these types of, and we get in contact with the different professors, the academies that did, uh, big reports, uh, and collaborations with the architectural part of Chalmers uh, helped us a lot with, um, these a situation or a crime prevention is actually some facts. A lot of the Swedish, uh, discussion about crime is only feelings and you know, they was like, Oh, but if you have sidelines like this, how many people should walk on the street an hour in order, for instance, feel safe. T

Interviewer: What do you think was the most value that the students added to the project? Like in that moment not for the future?

I_3: The thing that everybody gains a lot of things in this. We do it to gain, uh, gain access to talent, increase attractiveness of a company. We want to be the popular company. We want you to go around and say if you in the future or head of some office, I want to have him, Castellum. They are there. Of course it sales, right? Uh, we get the talent attraction. We get the network for the other companies. And the other companies have been in contact with other company's talents as well. And I think that the most gain for the students is instead of fictional, uh, theoretical education yet to to that has been a big problem for a lot of academies is how to connect, how to connect. You know, because we were working a lot of the things, the books that are printed, there is a problem with that system is that you are learning things that not, it's not actual right now and sometimes you learn in front technologies that are not being applied yet and this is a way for students in order to work with real things, real problem and see the complexity because things get more and more complex, more and more advanced. It's more and more perspectives and this is good, but if we don't train students in order to see that, they think, I'm a really good engineer, I know everything about the engine and then you understand, as I say, when you work, I'm educated in innovation but this people issue, this culture issue. You can have the best process in the world. You can know everything about every process or the big company has done. You can be a lean expert in the model. When you end up with the fifth 15 employees who 63 year old with white hair and says, Oh, we tried that before, it's no idea. Then it's different then the complex so that you get, I think the students will and of course you will get in contact with a lot of companies. You can get a perspective, and I tell this to a lot of students. You have to all the companies talk so much shit of us. We will be culture. We think culture is really important. How you have the culture. We have four words that are value words. Everybody that's you know, that's that's word poop.

Interviewer: But during a project to actually see what they do?

I_3: Yeah. You get the chance to know them. See what do they actually do, how, how, what happens when they do what you get closer to see and that I hope

E. Appendix: Interview transcripts

makes, makes it easier for you in the future to ask the right type of questions. Do you get the chance to be in a place where you actually get to develop the things that are important to you? Maybe also you think that you want to work for real estate company and when you come to the real state company, this is in theory, yes. But this is not what I want to do. If you get close to, we could help you and guide you to see what you don't want to work with. Which company up, how to call bullshit. I hope so because the same thing [inaudible] bullshit too. I tried to be really honest, but we do it too. And when I came to Costa alum, I wanted to be near one and a half year and the one that recruited me is my former boss. She has a group me a couple of times. Eventually she became CEO. She said yes. And I went along and I was like, that's bullshit. I know, I know. And I need people like you. Of course. Some of the things I tried to be really open, so if you quote me on your essays, please let me know if you quote me if I say something bad. I tried to be honest because I think in order to be that we gotta be better than the future and I'm not, I'm not afraid of the people calling me for the bullshit because I think that we need to work on, because in the beginning I did my homework on Castello of all these companies I worked for value. I want to create value in some sense. Ver, call it. I think that if the, if the students and the next generation of co-work students started to demanding that I'm not going to work for a company that does this or don't work with these issues and don't make sure that they are sustainable and don't make sure that the values or the gender equality is the most important. Don't tell me that this is the [inaudible] the board is full of old males. If you look at [inaudible] totally equal, and I created the organization for, for our company, made sure that the senior management level is still to equal quality. It can be done. And of course, I would not like to work for a company that says these things are important, but you cannot see it anywhere. So I hope, I hope that's something that you will take on by meeting all these companies. Because in some senses, I don't think Per and Ola are interested in working with companies that are not in line. So you will see, you will see a lot of the, the best of the best companies, but still, lots of them are things to do. But if that gets your reference points when you go out to meet the other companies.

E. Appendix: Interview transcripts

Interview I_4

Interviewer: Hello.

I_4: Hi, Svenja. How are you?

Interviewer: Good, thanI_4. ThanI_4 for taking the time.

I_4: Yeah, I'm glad we were able to find a time to talk and I hope I can be of help to your paper.

Interviewer: Yeah, I think so.

I_4: Okay. So you spoke with Jon, uh, last week.

Interviewer: Yeah, I spoke to Jon last week about his experience because he worked with a company in Sweden that tries to connect the university and companies in Gothenburg, Sweden. And he worked there for a while and so we talked about this and also like, uh, what they do at Autodesk and then he said it would be interesting talking to you because you like, like you said, you talk to the research team that involves like students in the product development.

I_4: Yeah. Um, so part of it is product development and some of it is, um, more of a, like a program creation, uh, type of thing. So, um, yeah. Can I give you an overview, a little bit about what ADX is and what my role is there?

Interviewer: Yes that would be really helpful.

I_4: Cool. Um, so AIX is a business unit inside of Autodesk and we focus on the education and that's sort of a wide umbrella. Um, it means that we want to provide free software to students and to educators, um, so that they can get trained up for and be prepared for entering the workforce. That means we want to try and get our software taught in different universities, um, key universities around the globe. And that means we want to be a partner in, uh, like upskilling for all types of learners. You know, everything is, I think we call it K through gray. So, um, from the youngest of the youngest learners to up into those people who want to rescale for, uh, um, you know, a pivot in their job or, or, um, you know, promotion or something like that. And so that's ADX. And then what I do in particular is something called lifecycle marketing, which is, um, like I mentioned, I, I work a lot with the research team and the learning content team, uh, as well as other marketing teams to, um, deploy out the right type of learning content to the right type of individual or institution so that, um, they can progress in their learning of the various products or services that we offer.

Interviewer: Okay. So it's like that the students are like the educators learn to use the software or do they also give feedback for you so that you can adapt it to the needs of like for example, students?

E. Appendix: Interview transcripts

- I_4: know on occasion. So we, we have a product called Tinkercad and Tinkercad is, is geared mostly towards K through 12 students and um, it is, it doesn't officially sit on the AEX team. Um, but we do have some connection points, um, we at AEX send that information up into the product team. Um, sort of similar, we have some initiatives on the learning side of things, um, where we're trying to figure it out. Um, something called credentialing. And so that information we get from students and educators and um, and lifetime lifetime learners, um, hiring guides, just to make sure we, the content of approach we're providing is the right type of content for the industry. And we also have one more initiative where we were working to, um, build sort of like, um, a, uh, a personalized experience in the products themselves for foll_4 who want to learn that product.
- Interviewer: And I was wondering like, why do you, why did you choose like to work together with students and educators and not for example, like the other customers that you have?
- I_4: Well, I mean that, that um, the product lines themselves are working a lot with, uh, everyday industry customers. So, um, there's many people who are doing that on other teams.
- Interviewer: Ah okay so you do it like in parallel, like students and customers?
- I_4: Yeah, yeah. Because we want, you know, we want to be able to make sure that, for instance, the interface or the, the features that we provide, um, you know, are first and foremost useful for industry, but are also something attractive for things like, um, educators who might want to utilize those features for, um, teaching in the classroom or getting out in front of, of industry trends. Um, so a lot of educators have interest in some of the more, um, future forward, um, features that, uh, you know, the industry hasn't completely adopted yet, but as educators in, um, in various, um, you know, postsecondary institutions, they, they have, um, they want to be on the, on the cutting edge so that you know, that they'd go, they become the go to person for that specific technology.
- Interviewer: Okay. So that they for example, include it in the courses and then students can take the course to learn how to use the product.
- I_4: Um, yeah.
- Interviewer: So that what you just said is that the Design Academy, because I read online that you have the program called Design Academy?
- I_4: Yeah. We have a design Academy that that's currently our primary area for learning in the, um, the secondary and the post secondary space. Not necessarily a primary area for foll_4 who want to learn way? Outside of that. Okay. Well, but design Academy covers all industries and all products. You know, obviously certain products are indexed a little bit more than others, you

E. Appendix: Interview transcripts

know, especially the ones that we're focusing on these last few years. But the idea of is that it's, you know, it's supposed to cover all different types of products and skills that you want to learn

Interviewer: And uh, the technology center that you have for example, in San Francisco and I think also in Boston. I think you also like work together with Academy or academia. Is it something similar or what do you do? Like at the technology centers?

I_4: Yeah, I, the technology centers. I don't know if I'm the best person to speak to that, but I know that on occasion we'll get entrance who will come out and work on projects like robotics or um, augmented reality or virtual reality. Um, we have interns that come out and we'll work on something like, um, you know, thought leadership and how we're branding ourselves as a company. So we have a pretty robust, um, internship program. And I think that those technology centers are huge draws for students who want to sort of explore or dig a little bit deeper into their, their education.

Interviewer: So do students usually let give you like new ideas what you could offer or what you could develop?

I_4: Yeah, I mean, I'm, I only know this second hand, but it's something like, you know, whatever they developed, they're able to take home and use themselves, but Oh, they have to leave us the instructions. Again, I don't know that for certain, I wouldn't quote on that. But, um, um, you know, students are.. The idea behind that is I think is that students in these programs, uh, I'm sorry that's the, the artists and medicine resident program. So a little bit. Okay. Interns. Yeah. We want, we want to use their, um, their ideas and their fresh insights to come up with new product features or, um, look a little bit further into the future on how we can innovate, um, you know, three to five years down the road.

Interviewer: Interesting. In my thesis, I also want to look a bit at if students already have like kind of an innovative mindset when they start working for a company or if they develop it because of the collaboration. Do you have like an overview of like students develop during the internship programs for example?

I_4: I don't, I don't know the specifics of that. I really only hear that type of thing second hand, um, on the, the company communication center. Um, but yeah, I mean I think with that, with any internship program, um, companies are hoping to attract, um, young talent, but you know, they also are, it's a two way street. You know, they want to, um, try and show them how to best work in, in the Autodesk environment, um, while trying to get their fresh and new ideas. But yeah, I don't know that the stats behind the program.

E. Appendix: Interview transcripts

- Interviewer: Okay and like your programs, do you usually have students from the San Francisco Silicon Valley area or do you have like also students from other universities?
- I_4: Yeah, I think, I think all over the world, um, in that internship program, uh, you know, just personally I've, I've interfaced with two or three in a AEX and um, they've come from all over the, all over the globe.
- Interviewer: Yeah, because you always hear like Silicon Valley, it's like the, where all the innovative people come from. And I was like, curious, like to compare for example, like Sweden and the U S and to see like, okay, are the students from Silicon Valley really more innovative than, for example, from like other areas.
- I_4: Oh, I see. Like if, if you, if you did a graduate program at Stanford or something that like, is that the main hub of innovative thinking?
- Interviewer: Yeah.
- I_4: Yeah. I don't know. Um, yeah, no, I didn't know that all that much. I think, uh, I think to some extent some of the values that we have at Autodesk is that we, we enjoy having diverse thought. And so, you know, if you have too many foll_4 from the Bay area, from Silicon Valley all in one place, you're not getting the benefit of, um, diverse thinkers from coming from different parts of the world.
- Interviewer: So you think like diversity is an important aspect for innovation.
- I_4: Yeah. Yeah. I think that's, that's my personal belief. And also I think the company would have liked that too.
- Interviewer: Uh, yeah. Like for example, like with the interns, uh, do you usually use their ideas if they come up with something new? So like, do you take it seriously?
- I_4: Yeah, I can, I can speak to the, the few interns that worked at AEX. They worked on, on really cool projects, um, ranging from, uh, you know, UX design. Um, there was, um, someone who just, who did a sort of a strategy for, um, AEX and institutions. So the move to institutions and um, yeah, I think, I think we've taken that very seriously and in a two to one or two of the interns that I've met, um, have converted over to full time employees, um, and have continued some of their work they were doing as an intern.
- Interviewer: So they developed like their own idea or, um, because I'm like, if they're an intern, do you give them like a specific problem or do they like work on the problem and then develop ideas? Do you know what I mean?
- I_4: I think it goes, um, it's a combination of those things. I think that they, uh, Autodesk has some things that they want to approach and there's a little leeway on the side of, um, the intern to try and figure out what they want to do at that

E. Appendix: Interview transcripts

problem space. Um, so yeah, there are, I think there are some parameters when, uh, when we hire those foll_4. The resident program. I don't think that there are as many parameters. I think that's a little bit different. And, uh, you can sort of, you know, do an art project or something that's more applicable to, you know, the construction industry or whatever. Um, robotics, I think that that, that is a little bit more open to, you know, your specific project or your specific niche.

Interviewer: Oh, okay. So you applied to the program, like with your idea and then Autodesk selects what could be interesting for the company.

I_4: Yeah.

Interviewer: Wow. Okay. Do you have like a lot of applicants for that program?

I_4: I don't know. That's, that's done through a different team, different organization all together. Um, I couldn't say.

Interviewer: Okay. So what for you, what would you say is like the greatest value of working together with students at your company?

I_4: Well, yeah, I mean, I guess there's two sides of this, right? There's the, the type of work that I do with students and a lot of that is around what do they, what do they need to get the right information? And so that the value there is really like, it's utility. You know, I just want to make sure that I'm not giving them resources that they just straight up don't need, but that's valuable information to me. Um, so that's sort of the marketing side of things. Um, again, I can only speak secondhand to something like the internship program, but other things that I've, I've seen presented there. I think it's just, um, uh, there's more, they have more time. Those interns have more time to sort of suss out these, um, bigger ideas because they don't have to do like their day jobs. Right. They don't to or will have to like hit their numbers and all those kinds of stuff. Um, and so that's sort of nice. Um, I've seen some really innovative thinking coming from the interns, uh, that, that, um, that is sort of, causes the rest of us to rethink about rethink how we do our work. And a lot of that is they have the leeway to do that, that type of exploration.

Interviewer: Yeah, because like if you have like your daily responsibilities, you might not like have time to experiment with new ideas.

I_4: Mm. Yeah.

Interviewer: Uh, is there anything else like, uh, that could be interesting. Like what do you think is interesting for my research? Like what from your work as a lifecycle marketing manager that I haven't asked yet?

I_4: Can you tell me a little bit more about your paper?

E. Appendix: Interview transcripts

- Interviewer: So, uh, I'm writing about university industry collaboration and I want to see like if the collaboration leads to an innovation mindset of the students. So I do interviews in Sweden and also here in California to see and like how the different collaboration affects this innovative thinking from students.
- I_4: So you're interested in seeing a change in, um, thinking in students through the collaboration.
- Interviewer: Exactly. So if like they are already like innovative when they start or if they like develop that kind of thinking if they see like this specific business environment for example.
- I_4: Well, I think that the, I think that the foll_4 that we've brought on in these internship programs are pretty innovative at the start from what I've heard. They've, they came in with some pretty good ideas or it only took a bit of nurturing to get them to, to have some really great ideas. I think what the value is, you know, doing that within Autodesk is, is the structure, right? So, um, you know, if you have a great idea that's great, but how is that going to serve the greater business? You know, how is that going to contribute to our goals? Um, uh, how do you present this in a way that, um, you know, foll_4 in, in upper management will, um, take interest in it. So it's all those sort of, um, skills that are pervasive in, uh, in a large company that are necessary for making your idea, um, happen. And, and so, you know, these partnerships and these internships really, it, I think it will probably teach, probably teaches, um, students that way of thinking, beyond the, the just blue sky thinking, um, that they get right when they're, you know, at the end of their university experience.
- Interviewer: Yeah. Like to learn that you cannot just like have a good idea and then like it will happen, how to sell it and convince people,
- I_4: yeah, selling, convincing these people, um, it's got to, you know, in order for it to be, um, something to pursue as a line of business, you know, it has to have certain uh, fundamentals, you know, for instance, how is this going to, um, drive to our, our KPIs, you know, our, our, um, our main objectives, um, is it going to help contribute to an evolving objective? Um, or you know, like basically figuring out how it fits in the overall structure of, of this business unit.
- Interviewer: Yeah. Yeah. I think that's also like important to learn. Like to see like what is needed or like where the idea could be useful.
- I_4: Yeah, definitely. Um, anything else with the life cycle stuff in particular?
- Interviewer: So you're looking at the life cycle of like the product also like to see when to invest, like to give the product. I'm just like curious, to bring together the lifecycle management and where the students come in?

E. Appendix: Interview transcripts

- I_4: Yeah. So I do customer life cycle management. So that's like, um, the idea behind that is students and educators, institutions as these sort of three groups of main audiences, they're constantly moving, migrating from one phase to another. So what we mean by phases are things like, um, I am just now becoming aware of Autodesk. That's one phase. And considering Autodesk, you know, and their resources, I'm, I'm, I've been sold on Autodesk that how do I get set up? Um, so there's these different phases that foll_4 go through and um, my role is to recognize where they are in those phases and help them migrate from phase to phase. So, um, let's say they just subscribed for the first time to some product. Um, my job from there is to recognize that moment in time and um, guide them through the onboarding experience or how do I, um, continue to show them new interesting things in the product or, um, you know, with the, the learning content that will keep them interested in, in all things Autodesk and make sure that we're continuing to be a utility to them.
- Interviewer: Okay. Is that also why you like talk to students? Like to see what is important right now and like how you can like market it?
- I_4: Yeah. Yeah. Yeah. I mean that's important to know. Um, understanding what the students need in what particular time is really important for my work. Otherwise we're just guessing.
- Interviewer: And so you do interviews with the students through the research team or like how does it usually work? Like the collaboration with the students?
- I_4: Yeah, the research team goes out and does, um, re uh, quantitative, uh, sorry, uh, qualitative research where they're, um, doing interviews or questionnaires, um, things like that with students, educators and um, foll_4 in industry. And then, uh, I usually take that information and I develop some sort of, um, quantitative test. I put that in market to sort of prove out what the research team discovered. And so we're always kind of doing that cross conversation where I, I'll say, Hey, I found something interesting in the numbers and, and they'll say, Oh, we're, we, we see something similar in our research. Um, and so we'll take that through line and, and sort of develop a theory about, um, what's going on and, and build off of that theory and, and try and, um, apply it to our marketing and, um, other efforts.
- Interviewer: Okay. Interesting. So you're like your marketing is like really based on the customer to like really identify the needs of like current and like future customers.
- I_4: Yeah, Autodesk they say it's a customer centric company, which means that we constantly want to be listening to the customer when we never want to be a technology company, which means we don't want to develop technology just for the sake of being the most advanced company, it has to serve some purpose for the customer.

E. Appendix: Interview transcripts

- Interviewer: Okay. So you're also work closely with the R&D teams. And do you tell, like, do you also like initiate maybe some product development that you say, okay, the customer seem to want this specific feature, can you like develop something?
- I_4: Um, if I find something I'm, I might reach out to R and D foll_4 or, or people who are developing features. Um, and if some insights, but I don't work closely with them that usually funnels through other, um, other entities.
- Interviewer: And when you look at the life cycle of products, do you also look at the... Because in class we had like an innovation diffusion curve. So if you have like an early adopter or a, yeah, like it's the early adopters and then the people that like adopt later. Do you look at that like at the different groups that seem to like, like adopt technology like early on or like some people that wait until it's implemented in the market and, and then, and then they buy it?
- I_4: Um, yes and no. I mean, the products themselves that I've been working on have been in market for a while. So there's that. But then, you know, when there are new features out there, a good example of that is generative design. And there's, um, this is, uh, like a feature of fusion three 60, which is one of our products as well as some of the other products. But, um, what we usually do, and they might be useful to talk to another one of my partners at the expo, but, um, uh, we have this group called the student ambassadors and those foll_4 are, are the early adopters, right? They are the ones who lend the new features really quickly. They go through a bunch of activities to sort of prove out, they know that information and then they've set themselves up as, um, support for other students or other educators. So for instance, like, um, it's sort of gamification of learning and you know, if you get a certain amount of points you're seen as more reputable within this ecosystem and then, uh, if you seen as more reputable, your, your comments have more weight. So it's sort of like a way of, of helping your community, but also, you know, having some, um, visibility in industry. So industry lool_4 into this ambassador program and says, Hey, look at these foll_4 who have all of these awards and this ambassador program, they're constantly helping out other students. They must really know their stuff. Um, and so that's the, that's the students drive or the educators drive. Um, and, and so we use that, um, system to really, uh, um, spin up our features in the educations.
- Interviewer: So like the student ambassadors get points when they, like train working with your products.
- I_4: Mhm.
- Interviewer: Okay. And that's like used as a motivation for other students like to learn your product.
- I_4: Mhm.

E. Appendix: Interview transcripts

- Interviewer: Ah, okay.
- I_4: That'd be interesting to talk to. Uh, my colleague Björn, he lives in Munich and, um, he runs that program. He interfaces with, uh, um, students, educators quite often. Um, the ones that they, that he interfaces with are typically these early adopter, um, you know, super user type of students.
- Interviewer: Yeah. Sounds interesting. Could you maybe give me his email address?
- I_4: Sure. I'll send it over to you after this call.
- Interviewer: that's nice. Autodesk seems to have like a lot of programs all over the world. Like to involve students. It's really interesting because I haven't heard it like from other companies because of course they have like internship programs, but like not programs where the students actually are involved with the product. It's interesting. Yeah.
- I_4: Yeah. Well, you know, I think a lot of this is, um, we want to, we want to be able to be thought leaders in the future of work and future of making things. And to do that we need to have close connections with, um, foll_4 who are learning this stuff in the education system or teaching it in the education system.
- Interviewer: Yeah. To like start early on.
- I_4: Yeah. Just, you know, early, you know, to get, um, early adoption of the products, but also, um, to get insight into, cause a lot of times institutions, universities, uh, are doing research right. And they have some insights into, um, you know, future work or future making that maybe we haven't seen or, you know, they, they might have more of a pulse on one way or another. So it's for us to be working with those, those institutions as well.
- Interviewer: Yeah. Yeah. It's an interesting like balance because you get insights what universities do and also universities learn like what the market wants.
- I_4: Yeah.
- Interviewer: Yeah. Thank you very much. I think I'm through with my questions.
- I_4: Okay. Not a problem. I was glad I got to jump on this call. Keep me to on this paper, I'd like to see it at when it's done.

E. Appendix: Interview transcripts

Interview IU_1

Interviewer: Okay. So your experience working with students was it while you were working at know it or was it before?

IU_1: So I have different experiences. So before, so the first time I met Per, First to Know was while I was working as a course leader at the design school of GU. And there I was creating student projects together with Per mostly. And the ambition there was that the students would get more real life experience how it is to work with real projects rather than only theoretical projects in your university. So that's one perspective I have. And then I also have one perspective where I worked with two students whilst I was a consultant.

Interviewer: I saw on your LinkedIn profile that you also worked as a teacher? What was your motivation to be also working as a lecturer? Not just like in a company.

IU_1: So that's actually how I started. So I did my master here in Gothenburg and I have been working before as a graphic designer for many years. During the last master year I was very interested in research and that is through my professors I started being part of a research project when I graduated. So from studying I directly went to the research project and I stayed at the university and then the teacher of the master program asked me if I wanted to start teach. So that's how I actually came into teaching and I mean that's also what a lot of people do do 50% research and 2% teaching or something like that. That was also actually what I did more and more. So first I started with teaching one course and then after a while I even got to be like the right hand of the head teacher of the master because there weren't so many teachers. And since I had, you know, a big student perspective since I just graduated the master. So then I did the teaching and research. I did it side by side and also started to collaborate with other universities so I was also teaching at Chalmers. And at this medical schhol.

Interviewer: I think that's interesting because they have like a university researcher perspective and like the industry perspective,

IU_1: so they're always the university also always looks to have that industry perspective but that s of course not so easy for them.

Interviewer: But do you think that universities want to collaborate with industry?

IU_1: I really think so. I think that's really a trend also especially in research, especially when you're talking about innovation researchers especially young researchers also realize that only theoretical research is not going to give you anything, is not also providing anything new. So since I've been working with this researchers, I really know that they always wanted to have some kind of real life project, some, some industry partners or projects to actually work with so that their research could be applied. It was very much about applied research and action research were they called, which means that you are part of a project

E. Appendix: Interview transcripts

and the designer for example but you are doing your research while you are working on a project but really working with a project and thinking about how can this be applied to theory or vice versa.

Interviewer: I was thinking that could also be like interesting for students because maybe you have ideas what you could do or like maybe even like found your own startup but if you have just the theoretical perspective, you might not know what works like in real life or industry.

IU_1: Exactly and especially I think for the master thesis in my school that is, there's a lot of this, the students who want to have real life projects so that they actually did something but also of course the theoretical background and what is the theory test the theory or see what works what doesn't work. But I think also in the last years more and more this was really a focus that they, as I say, they can try out something if theory works or not or maybe sometimes they even develop new theories.

Interviewer: From your company perspective, what do you think? Why is it valuable for companies to collaborate with students?

IU_1: I mean it's very different from company to company. So in my company it was a little bit in between somehow. It was not that when I was suggesting student collaboration everyone was like yes, it was more like okay. what is in it for us? What does it give us how much time can we spend because time is money in this world of course, much more than at university. So in my company especially it was nteresting, when the project was interesting and when the students also maybe not promise, but at least it would say that the company would also receive something practical afterwards. So not only a report and a presentation, here's what we found, but maybe you can implement something, like a couple of workshops or developing a method or process with, of course some company members, so a little bit more than just the McKinsey reports read it or leave it.

Interviewer: So they want an applied solution?

IU_1: That would be the most ideal. But of course that is not always possible. And of course everybody's also aware, even if you start with a master research project, you might also end up somewhere else or you will not deliver, what you thought in the beginning. That's always the risk that we have but therefore my company they were also always a bit, um, not steering, but very well aware which, um, guidance they gave to the students so that they could guide them in that right direction, maybe not in the direction the company wanted, but at least in a direction where there would be an actual result. That was important for them.

Interviewer: Did the students have like relevant ideas? Did you actually implement them?

IU_1: Yes. I mean they had relevant ideas. I remember those two boys, for example. So they didn't have something really to implement for us. But it was about I

E. Appendix: Interview transcripts

think emotions and vulnerability and empathy in change projects and leadership. So their findings were really interesting to us. Because it is often actually, yeah, what companies want or what they realize later on that they wouldn't express [inaudible], this is this reflective element of the student's research because the students reflect, they have like 10 interviews and then reflect what everybody said and then mix it with some other theory or industry, some other interviews and then you have this conclusion, and if you package this in a good way and give it back to the company, the company might learn something new. And that is maybe sometimes enough. But the company, you know they would not say this in the beginning because they want something concrete. But in this example with the two boys, I remember that they delivered this actually very interesting new insights and everybody was happy with that also they didn't expect that. At least, there is something new that is somehow valuable and interesting. That's also good. A good result.

- Interviewer: Okay, so they have both some kind of like incremental innovation where the company says, okay, look in this direction and find something or like they come up with something completely new.
- IU_1: Yes.
- Interviewer: In which forms do you work together with students?
- IU_1: We try to be their tutors. So let's say there's one um, colleague of mine that has a lot of time because you know, they don't have a strict project or something else. So then we assign one tutor to the students, the student group, and then they would meet once a week. What we also did before we had a tutor group that the students still met someone once a week but it was not the same person all the time. But that's all the, how we give....So, tutors. But the students would always, they would apply to us with a topic and then we will choose a group.
- Interviewer: Is it within a course?
- IU_1: No.
- Interviewer: Do the students think of it themselves. Okay we have an idea and they approach you?
- IU_1: Exactly. And then they often also study different things [inaudible] so for us it doesn't matter. Sometimes we have this like open nights where the students can send in their ideas and we try to promote it a little bit in the different universities, but often through personal contacts. It is not like we go there and have like a big lecture. This is what you're looking for. It's more like I have colleagues or ex colleagues at Chalmers and other universities and I tell them. We are looking for students or now we know it's master thesis time. We're happy to have one group. And then we hope that students to approach us and we often have like a deadline and then we look through the ideas. There's often

E. Appendix: Interview transcripts

just a short description and we also look through the CVs. And then we decide. But for us it's not too important, from which course or university, they're coming from.

Interviewer: Just the idea?

IU_1: Yes.

Interviewer: And what do you think, what can these projects with students generate that you cannot like do on your own?

IU_1: A lot because we'll never have the time. So this is why I said this reflective thing is actually also good and important because we never have time to even reflect about our methods about our projects because in consultancy life you basically just do and do and you do try to not get stressed. But once the students are coming in, they give you the opportunity to... So first of all they reflect about what you tell them and what they hear. But also you reflect together with them in an interview situation for example. And you also hardly ever, you know would take an hour per week with your colleagues sitting together reflecting about what you are doing. So the students basically force you to do that, which is very good.

Interviewer: Your experience with first to know.

IU_1: So there I actually we had the experience when I was working at the university but not as a consultant. At university, I always really appreciate it, especially with Per and was always approaching me because he was always looking for students doing different kinds of projects. I think I have been working with three students groups together with him, so that was really good that you didn't have to look for projects yourself as a course leader, which you have to do, but it was really nice that Per and First to Know has this interest in working with students. They really value that and then it was easier for me to assign a student group to their projects, so that was really good. So then the project itself, it was varying in quality because they just started off rather in the beginning. So it wasn't always very clear [inaudible] I have heard from the students. It was not the most excellent collaboration ever. But I think the student really learned a lot to also take their own responsibility to push the project further. Also Per and first to know and the space as kind of a background and a safe space that they could form it as they wanted and they got a lot of contacts I think. But they had to realize first that it was really them who should be driving the project. I mean maybe also it is a different culture I think. Where you are coming from, what you are used to that in some cultures is really clear that you know, you as a student, you are the one that decides basically in other cultures it's more like a harder professor tells you your topic and then they are happy to have a professor. Um, so, and I have always worked with international students. Of course there was also a little bit of a culture clash within the group.

E. Appendix: Interview transcripts

Interviewer: So first to know, gave you the ideas or?

IU_1: I think they came with certain ideas. What do we want to have? And in this stage it was more about them, I remember one group, it was, this new space and they wanted students to come up with a concept of this space, what that is. But actually you've got somehow idea, but you know how the students approached the people whom they interviewed, how they worked with it was really up to the students. And then there was one group, I remember that's was more working with the space as from a branding perspective. So what is the space, where should we advertise with whom. Who is the target audience? What is their value? One group also did some kind of easy business, like a value proposition. Yeah, I think they always give a direction or a couple of directions and then the students can choose what they want to do.

Interviewer: Can you also think of something that the space could do better?

IU_1: They could be very specific with what they are and what they're offering. What do students get out of it? What the companies get out of it. I think it's very important that they don't promise more that they can offer because that's what happened a lot in the beginning. That's a little bit kind of a false attraction to students or Hey, you can talk to this, this and this company and then it is only two fro example you actually talk to. That is a littl ebit unfair. I mean it's also some kind of advertisement strategy, but it really is unnecessary. so rather be honest about the connections you can actually provide because sometimes two might be enough. So be honest, be precise with your offer maybe also be precise what students, the companies and also themselves get out of it. Because you know in hindsight it looks like they got a lot out of it, the students, of course they had their projects. It was important for them but it was mostly First to Know that got most out of it. And that is not how it is supposed to be probably.

Interviewer: Do you think that company size or organizational structure has an influence on student collaboration?

IU_1: Definitely. And also very much leadership I would say. Because if the leadership is Interested in research that also students can do or professor researchers. Then they would always find the money to do it and if they're not they won't do it. Size. The bigger the company, the easier it is to find the money to work with the studdents and find the time. So the bigger the better, but then maybe the medium sized is the hardest, but then the smaller comapnies, I think they're also interesting as well because they would use the students' research and all the insights even more, because they would see this as an important project because they won't have researchers themselves and I don't know if they would pay students or not. That's a different question, but I think the smaller companies would value a student work differently than a medium sized or bigger company because they would rely on it more. They might even sell the insights or outcomes who knows but of course hopefully have the students be a part of selling the insights as well. But medium size company. I don't know if they would do it because it's too much work and for a bigger company it might

E. Appendix: Interview transcripts

work again because they might assign one person. You maybe try to publish an article with the students or they would I mean look very much on publicity e.g. What can the gain from it. yeah, and then as I said leadership.

Interviewer: So the leader has to be open to like innovation and try out maybe new things?

IU_1: Try out new things maybe also know a little bit about research, how it works, be interested. Maybe he or she is a researcher. I know that from one example in Denmark where the head of the company is doing a part-time PhD and of course he was always super interested in having other researchers but maybe that's a similar example. So I think leadership is really kind of the first important step for having students or in general researchers.

Interviewer: And what do you think is the most important source of innovation for a company?

IU_1: I think it is more like a general mindset. I think if you give the employees time and space to be creative they are going to be innovative. So I don't think it's like giving them money or a specific thing and giving them the opportunity to be innovative. And I think the opportunity to be innovative is letting them be together maybe without a specific goal. Just hang out together and talk about crazy ideas or maybe do a hackathon or workshops. But it's mostly time and space.

Interviewer: Do you think students can help like to build that mindset?

IU_1: Yes sure.

Interviewer: I mean like if you bring in like new ideas and new perspectives that the company thinks okay, yeah if we sit together and like reflect more.

IU_1: Or maybe they could even come up with a strategy. How companies could find time to reflect more and sit together. There are tons of possibilities how students could come in there. I mean if these students develop new ideas through their research for example that might be a first trigger for the company to do more things like that.

Interviewer: And you said that like in your company for example, students already come up with an idea and like approach you, but do you also think that the collaboration helps them to build their innovative thinking or do you think they are already like having that innovative thinking when they approach you?

IU_1: It helps more to inspire with the result or even during the project with the collaboration because the thing is that the consultants when they work with the students they can never, you know, on the spot implement some of the ideas or do anything with the ideas because they are having their own project often. But off course they can be inspired by these reflective sessions, by the ideas of the

E. Appendix: Interview transcripts

students, by their time they spend with the students. So I think it more an inspiration and then it depends very much on the employee itself, how open this person is to be inspired.

Interviewer: And like for the students because I'm like trying to figure out if the students are already like innovative from the start or if they build it through the collaboration they built this thinking?

IU_1: Good question. Depends on how the students work. Sometimes it happened that students actually worked together on a real project and then I think they are, there is a greater disability that they are like building this innovative thinking, but sometimes the project is also set up more like a series of interviews and then I don't know if it really impacts their thinking then it's more for them to like source again on the knowledge for them. They can use however they want. I think if you really involve students in a real project where the company really works in that project and then they have the students maybe follow. I always thought it was always my idea to work the project and then I always tried to get the students to follow my project and even you know, maybe work on developing some workshops or whatever because then it would be a part of the project but not officially of course but in the background and then definitely their innovative thinking and thinking in general would be impacted a lot. Because they would learn a lot, they would be there in a real project. There would be layers of knowledge. But if they're only doing interviews and theory, I don't think that it impacts their innovative thinking. Maybe theoretically but if they never work practically except for the interviews.

Interviewer: Also because they have the idea already from the start so they don't like collect information then think okay this could be...

IU_1: maybe they could maybe it could be like this but it's very theoretical. We don't do anything with it. Right. You test collecting information, think about it, write about it. Maybe they have a new idea, let's do the testing.

Interviewer: Did it happen in the past that you used the results from a master thesis and implemented it?

IU_1: No I don't think so. It was more inspiration for us. But I have only been working two or three years as a consultant. So you know more senior people.

Interviewer: But do you also offer internships for like a student has more time, like you said, like to follow the project?

IU_1: No. Unfortunately not I also always tried that I wasn't successful because my boss thought it would take too much time. Again, coming back to leadership, if he would have been more open then, but also you know my situation was a bit special when I was starting at the Consultancy because I was building a whole new team as a designer and that was working in the business group as a

E. Appendix: Interview transcripts

designer so I was bringing design thinking to this group so I had to build a lot, a whole new group. This whole mindset, you know how to work with DT so there was a lot of other things going on and I think this is also my boss chose to say no, you're already did this, nobody really gets what you're doing. Focus on that one first.

- Interviewer: Because it would be interesting with design thinking maybe like to also have students, they don't approach you with an idea but maybe build, find something, to collect information and then like go into a specific direction.
- IU_1: Actually now that you're saying it there was one group and they got the task to work more with us internally. (inaudible). So we gave them the task to analyze us as a group with all our skills and competencies and come up. Yeah. We gave them a really concrete scope. I mean they had also this basic idea and then we developed together with them goals was,. One goal was to come up with a concrete method or a process that we as a team can use to work more with our competencies and skills. But also to better communicate our skills and what they did the students did that they also, of course did interviews with all of us, but then they also did workshops and then it was more practical with what competencies and skills we had. So they created their workshop. Um, and then in the end they came up with a tool, how we as a group should monthly see over our projects where we were what we learned also as individuals. That was a really concrete outcome. More towards design thinking. A bit more more like innovation, social innovation, probably because it was for us. It was not a new idea that we can sell, you know, to get rich. It was more a way how we can actually reflect and understand each other better in our group. Also learn how to better communicate, what we do, what we are good at how we complement our differences because we were so different people with different backgrounds. So they actually did something very concrete that we totally could use internally. And also we did that for some weeks. It was like a map basically a tool that help us to reflect and build. Also our team dynamic.
- Interviewer: Did the students come up with the idea to develop such a tool?
- IU_1: Yes. So we said we wanted something concrete and the tools were their idea.
- Interviewer: So you gave the students space to develop their own idea of what they could do.
- IU_1: Of course.
- Interviewer: So what do you think is the biggest value for students like coming out from the collaboration?
- IU_1: I mean definitely get the real life insight and I think it's super helpful because especially in your universities. You're often so far off from the reality. Because we have seen it often with students that they come to the company and they've been pretentious and naive to think you know what, it can do

E. Appendix: Interview transcripts

everything and without putting any effort. So when you're working with these kinds of collaborations you definitely get a hinge of how it is in a real life, you probably also develop some kind of humbleness because you realize not everything is possible in a week. So for the students the most relevant thing is, yeah, just to be faced with real life challenges and also often with organizational politics and structures, which are unfortunately very impactful. I think the real life experience.

Interviewer: Did you also use it as a recording tool? Like to get to know students?

IU_1: Yes. Yes. Actually, one student started with us after.

E. Appendix: Interview transcripts

Interview IU_2

IU_2: I'm retired so mildly, it really is going over to UCI to mentor companies. So we're going to try that next week via, you know, these kinds of zoom calls. So we'll see how that goes. I did one yesterday was a little bit of a change, a whiteboard, cause you're strategize for somebody want to jot some things out. It's a little bit harder to do over the phone.

Interviewer: So about my thesis, like as I wrote you, I'm writing about university industry collaboration and the effect on students. Um, and I was curious like to talk to you because I talked to Chloe and she said that they have the innovation advisor network and uh, yeah. Uh, so I want to talk to you about your work as an innovation advisor and your connection to the companies you worked for mm. Yeah. But first of all, do you mind if I record this interview because I just saw that zoom Started recording.

IU_2: Okay.

Interviewer: Okay, great. Yeah. Uh, so could you give me like, yeah, exactly. I like with the transcription and like it's better also, my supervisor said they prefer it because then they can confirm what you interpret.

IU_2: Yeah.

Interviewer: Uh, yeah, exactly. So could you give me like an overview of what you do as an innovation advisor?

IU_2: So, uh, yeah, so as an innovation advisor. There is a couple of different roles that you play. Uh, but most of it is, you know, most of it is around mentoring the companies to different degrees as you know, as they go through their development process. Some of them, you know, I might stick with and work on a continuing, you know, bases, one I've been working with for the last couple of years in fact, and smell, it's kind of graduated from the program. They're selling their product and some of 'em, uh, then you just come in for a spot question. They want to just have you review their pitch deck and just getting your, you know, your insights there. So it just kind of, it really varies on the companies. The real challenge that I think they're having. Just an interesting challenge that happens with the innovation advisors is that the companies come to your teams or whatever they're coming through. They're overly respectful of our time and what that means is they're very hesitant to reach out. They don't want to bother us. It's an interesting thing cause you know most of us are all guys and gals, right? I mean a lot of us who've been through our career and either retired or near retirement type of thing and want to get it back and that's really why I joined the two folds. One is I like to encourage these companies and hopefully I've got a little bit of thoughts or insights I can provide to them as they develop I also want to promote the orange County economy. So in a lot of the thoughts on this whole was to create an ecosystem here, start up companies much like

E. Appendix: Interview transcripts

you've seen in the Bay area and then also close to here, Santa Monica area. There's a lot of startup companies. That kind of created a community growth. (inaudible) Can we do that here? etc That would just be helpful to the whole economy in orange County. That's kind of, you know, why we got in, why I've gotten involved in I think a lot of that stuff. That's why we're doing it. We're, we're there just to kinda help them mentor them along and on the side of being retired. It does, you know, I don't want to say wrong, but it gives me something to do too now again. It keeps me active in the, let's say the business community or the this world that. It is also is exciting to see the ideas that the, I'll call them kids, but it's exciting to see the ideas that the kids are coming up with the thoughts, it is energized and it keeps me kind of on the forefront of technologies. And I'm also learning, you know, I'm a kind of consumer like electronics kind of person, medical products. I've been involved with all sorts of different that I'd never knew anything about. So it's been a learning experience for me about learning different industries, which I always enjoy during my career. It gives me that as well.

Interviewer: Yeah. Yeah. You talked about the inspiration of the students. Do you know where they get their ideas?

IU_2: It's all over the map. Most of it comes from some kind of experience that they've, they've encountered. They're trying to kind of try to solve a problem for themselves for the most part. The one company that I have been on that now that it has a little board among those board of directors. So I've kind of gone on to do that. Um, and he, uh, he's a good example. He's a skateboarder and surfer. I got to tell you a little funny story. And I'm an old guy. So stereotypically kid comes into, uh, a picture meeting just to meet with us, carrying a skateboard, kind of a little bit longer hair, wearing a tshirt. I immediately wanted to dismiss him, cause I came from the corporate world, but I've learned not to do that. And then it turns out, as you start some talking, this kid really knows what he's talking about. , but here the skateboard, um, he'd like it to perform more like his surfboard, which really means you like your skateboard to turn a little bit quicker. And he went in his garage, basically his parents' garage built a little contraption that goes on the skateboard that allows the wheels to turn more sharply. So it was solving a problem for himself and that was turning into a business, you know, for, you know, sell that product up to the marketplace. That's where a lot of it comes from. The challenge becomes with them is they're so invested in their problem. Does anyone else really have that problem or how important is that problem? That is the biggest issue, you know, you run into.

Interviewer: Oh yeah. Is it also like that you have projects or internships that the students get to know the business world and then they see, okay, this is a problem that we could solve or that they give like the companies an inspiration.

IU_2: Well, the companies here thought that they're all startups, so they, they're, like I said, they sometimes there is an internship program where they can get interns. Um, and sometimes you know, the teams in the product as it develops, the dynamics between the different members of the team. And as they start to do

E. Appendix: Interview transcripts

customer discovery, it's not uncommon for them to be calling down one product idea and then five ways. You know what that really isn't. But if we turn twist a little bit here, there isn't, there is something here. It's just not what we expected to see. The challenge is most of these are going to fail, right?

Interviewer: Yeah. Yeah. And probably like, do you have like a lot of successful student startups?

IU_2: I wouldn't say a lot. We have some, uh, calling or while I'm flipping I could tell (inaudible) successful they are. And I kind of view it, even if they fail, they've succeeded because they've learned something and most of them have a passion, a real interest in starting their own company and they can learn hopefully from it if they fail. I think they do. They learn something that'll help them as they launch the next idea. Failure is actually very helpful to them as well as to, they all want success, but they learn. They can also learn from their failures.

Interviewer: Yeah. So that do you think they develop like this innovative mindset when they join to apply to innovation programs at UCI?

IU_2: Yeah, I think they learn a lot more about, you know... They learn a lot more about what it takes to really start a product and move the product forward to the development. They learn a lot about, you know the investment world, I'm also on the co fund, which started when this whole cove started, they also started a fund to fund these companies. Now it's expanded because we don't have, we can fund non UCI companies, we can fund any company, any start up in orange County or in Southern California. So that's a, you know, another little adjunct to it. But they learn, they learn about what funding is all about. I mean they're getting out of the academic world. I mean they show us the return on investments, you know, kind of numbers you go with. Investors at this point don't care about the return on investment and internal rate of return and those kinds of things. I mean the return on investment that we're looking for, if you want to it the SharkBite is 300% of our investment and they're shocked by that. But then they learned that it has to be that because in the end we're only going to make 15 or 20% because almost all the investments you make are going to fail. So they just learned a lot of these lessons that makes it, um, it just gives them the background so they can move forward cause they're just so naive coming out of, you know, school environment and academic environment. They don't understand how the world really works and what's really involved in all the little issues you'd come up with.

Interviewer: Yeah. I think that's why it's important that you have this program, like to give the students this real real world perspective.

IU_2: Yeah. Hopefully it will pay big evidence as we move forward.

E. Appendix: Interview transcripts

- Interviewer: Um, yeah. Do you know, like how did the innovation advisor network got started? So UCI approached local business people or do you know how it started?
- IU_2: Yeah, no, exactly right. I mean that's kind of what it, it was kind of word of mouth and it's a tight knit community when you start to get into this area. So they've got some, there's another investment organization here in Southern California is pretty big called tech coast angels and the characteristics of the people in tech coast angels are kind of the same as what you're looking for in Innovation advisors. And these are sort of guys and gals embassing in start up companies. But most of them are at the point that they've made enough money. They're looking for other things to get involved in as well. It's just natural to become an innovation advisor. And then that network just grows by word of mouth. Yeah. And that's how we've done it.
- Interviewer: Oh, is it like popular for companies here like in orange County or Southern California to join the innovation advising network?
- IU_2: Not really. Companies, it's not company driven. It's individual driven.
- Interviewer: Ah, okay.
- IU_2: So like I said, there's a reasonable number that are retired or, or you know, they've started their own companies. Um, you know, there are people that work for large companies that have joined, but it's, it was they, they found in recruiting. I don't know if their companies are really sponsoring them or they're not discouraging them, but I'm not sure any of the companies are encouraging.
- Interviewer: [inaudible] okay. So it's like a, like a, like an innovation adviser. If you're not retired, it's like on your own time to support the students.
- IU_2: Yeah, I'm sure the company and company wouldn't object to them, you know? Yeah. Most of these are senior people that they can come and go as they want. They're not elderly, you know, do they want what you find has been interesting. It's organically, I think Richard Sudek who started this has done a great job of painting a vision, what we're trying to be accomplished and most people as you talk to about what this center would be, what we're trying to, we're trying to do here and get very supportive of trying to help or try to help the university students. Everyone thinks that's a good thing. Trying to promote business and orange County, that's a good thing. I mean there's just lots of good things that the community here is just the business people just kind of, you know, are drawn to, there's just so many reasons to be involved in this kind of activity. And it's, it's interesting, as I contend we can, if a company needs as part of the network too, is if the company needs some guidance in maybe a particular area, maybe a company and a large County that's involved in that area, it's kind of six degrees of separation. We can get them into just about anybody in any company in orange County because you just have to put the word out within a

E. Appendix: Interview transcripts

couple of days. You find somebody that knows somebody that knows the CPO or knows the VP of marketing of that, you know, whoever you're trying to reach.

Interviewer: No, that's great. Yeah.

IU_2: Becomes a powerful tool for the, for the startups to take advantage of because they can tap in to all the knowledge. It's in the, you know, it's surrounding us.

Interviewer: So yeah. You have like also like close ties to the UCI research park?

IU_2: Mmm, no I wouldn't. Well if we need it sure. I mean certainly they've got the intellectual property office and things co located in the Cove and applied innovations. I think part of doing that was to try and connect and get them more involved in what's going on and startups in the business community and those kind of things. But see most of the things I get involved with are going to be companies that have their idea that name just needs, you know, they may need some whole technical assistance. Most of them need marketing business development. That's usually where they're lacking.

Interviewer: Ah, okay. [inaudible]

IU_2: yeah cause everyone goes to the product idea, that's what they started with. They start with I got a product and I can build this and people might want it. And then actions in today's economy cause an interesting problem because it used to be, you think about sales and marketing a lot more cause you'd have to get it out to brick and mortar stores. There was a big, big issue and now it's, you can do it online, you can do social media. But now they get lazy and people say we're going to social media to market our product. Okay. It's doable but it's a lot more complicated than what you think it's going to be. Get a blogger, post a Facebook ad and they, but they, they almost say underestimate the sales and marketing. Now they take it, they don't pay attention to, to the very end.

Interviewer: Wow. So they don't develop a strategy.

IU_2: Yeah. And get the talent or the people to help them. Cause most of them are some type of engineer, right. Or application developer or something like that. They're not marketing people and they don't go out and seek those folks. They think it's just easy to do because you hear them, there's, Oh you just posted, it goes viral and everything is wonderful.

Interviewer: Yeah. Yeah. On paper. So you help them like to develop a strategy and to make them think about these difficulties or like what they have to think about.

IU_2: Yes.

E. Appendix: Interview transcripts

- Interviewer: Okay. Do you also sometimes help them with the idea, so like to give them like the real world perspective and tell them, okay, this might like, have you thought about this? This might not work or maybe you have to adapt it.
- IU_2: Yeah, absolutely. The challenge there though is quite often we're not their target market, right? Because again, we're old guys and they're usually, that's not the market they're going after. So you've gotta be a little, you gotta be a little careful. I see some of them and kinda, I know I'm an old guy, so I just preference preference that I've had may havetried to stay on technology and, and what's going on in the marketplace. And so it's, I think I'm fairly tuned in, but I also, there are areas I just don't understand. So you gotta be just careful, challenging a little bit, but remember I'm not your customer. Think about it, makes what I'm saying sense. And maybe it doesn't apply because I'm not your customer. So that it's a little bit of a, and you find that with some of the, some of the advisors that are kind of stuck in their ways and this is, you know, and they think they don't realize how fast the world's changed and not stand on top of some stuff. One of the challenges for these for the teams is they get to me with a bunch of us and we're all going to give them a slightly different opinion. Now ultimately they're the ones that have try and weed out what are the good thoughts and what are the bad thoughts from us. And, and that can be a little bit of a problematic for them or overwhelming when I talked to them. Sometimes they're overwhelming stuff that we've got the sort of different advice. And so oftentimes I'll sit and say, okay, let's talk about my advice. And advice she got, let's see if we can, what are your thoughts on, let's see if we can get to what the right answer is. Clearly mine is not the right one. And I know the other one he got is probably not the right one either. So let's see if I can help you figure out what the right one is rather than I do.
- Interviewer: Okay.
- Interviewer: so is it, uh, do you also have, I don't know because you have the UCI research park. Is it also possible for the students like to approach maybe like a tech company on like in the research park to ask for their advic. Did that happen before?
- IU_2: The research park is just, there's so many companies that are not focused on the research park and then there's some companies there. Like I said, we can connect just about with any company in orange County that we think might, the student might benefit from , of course you also have all the technology people at UCI to connect into. Oftentimes there's professors that are, from a technology standpoint, we've got a wealth of knowledge. Going out to the marketplace you can get some manufacturing assistance and guidance and maybe talk a little bit about the design. Some of the things you might run into like design and then also just the market and market expertise coming from these companies. The problem is, an interesting one, it is getting the companies (start ups) ask for enough help.
- Interviewer: Okay. So they think they can do it on their own?

E. Appendix: Interview transcripts

- IU_2: well, going back to my earlier comment, it's just they seem to be hesitant, forgetting that we're volunteering our time, but you know, like with anything, you get some innovation advisers that have an ulterior motive and that's, and we've got to watch for that. And that is if they're looking for a consulting job or they're looking for something. So wherever you saw, Hey, this I got, great, I'd be happy to help you by the way, give me some stock and give me this or that. It's like, wait a minute, that's not what our role is. So there's a little bit of that.
- Interviewer: So when, as soon as the startup becomes like more successful they pay you as a consultant, you mean or,
- IU_2: yeah. Even before they get successful. They just ask for stock as quote unquote stock number three. Right. So when you start out you have to be very careful of watching for some of that, cause that's not the right thing. It's not what we're supposed to be doing. This isn't a place for us to go and look for a job or for consulting or any. That could happen organically that absolutely can, but you gotta be, there's a fine line there. It's easy to weed out, but that isn't, you know, that is a little bit, yeah.
- Interviewer: I saw on your LinkedIn profile that you were working at Principal before and uh, I was curious like when you were working at the company, did you also work with students in form of internships or projects?
- IU_2: No, no, that was just so if you go back in my career, so I worked for HP for 20 some years in different kind of business development roles. So, early 2000 and just wanted to start out something on my own. So I started doing some business consulting in orange County and then one of the companies I was consulting for, and this was before the cove ever got started, the cove started when I retired, basically. So I then ended up working for, not uncommon on, right. I was consulting with a company here in Irvine that had a technology and some products and I was helping them develop the products and marketing and price the technology. And then that led me to get involved in the investment area cause we needed to raise some money. So I started working on that, which is not something I've ever done in my career. So that got me into the investment world. That then led me to a family office out of Chicago, which you saw that was a family office. They own five, five or so different companies that they operated. I ended up joining the family office and helping them grow strategies for their operating companies and then the founders in his, and now he's in his late nineties so this was five or six years at nineties decided to sell the companies cause his kids didn't have real interest in the companies. So that's when I retired. I did do a little bit of consulting. That's about the time UCI and Richardson Zudek founded it. I've known him for a long time. He's the one who introduced me and got me involved there. So since then I do consulting and I won't take on any role for any of the companies there. It's not my interest. I'd like to just help them. I don't need the day to day operational challenge.

E. Appendix: Interview transcripts

- Interviewer: I was just curious to figure out like how it's in the U S like the company student relationship. Also if the companies are interested in having interns or like projects with students.
- IU_2: no, I don't see, I don't see that... The students may hire or not hire, but students might take on some interns during the summer and that's really, you get the typically UCI students, more students engaged in what's going on and help the start up with whatever, some market research or development or in, you know, helping them in some fashion. Some of them turn out to join the company too. I think that may have been a couple times with the interns or asked to continue on with the project. Finding in these kind of centers. One of the real challenges for all of the companies, which is I call it finding their co-founders, rounding the team out. How do you farm the, and the funny thing is I know there's a bunch of just I'll say students at UCI that would share kind of a passion of wanting to get into a startup company. You have those startups that need people and there's just haven't found a real effective way of marrying those together so you can connect those folks together to, you know, to, to make your team stronger.
- Interviewer: Yeah. I see. Yeah. Because the Cove, isn't that like a place to meet for students and for the startups?
- IU_2: Uh, not, not really. Because people in the Cove are on a daily basis are members of these companies they are already part of a company. So yeah, you need, it needs some, you need some other external and a lot of people don't even understand it. What's the comb and what's there and there are some events where you can come to and you can meet. There's one cup. Well normally would be coming up on Thursday. Now it's gonna be done online. So not going to be a lot of that work in there. So there are some events but there's not a great way of connecting co founders to founders and help the teams out. It's unique because most of these companies, all, almost all of them need somebody that's willing to dedicate time without getting paid because they're really going to become a part of the company and their, their payment really is going to be some part of start ownership and that, and I mean the other side not only from students but you do find, we've had a couple of these that you do have innovation advisors that I know I was sort of my worry about what they're trying to do but not really looking for a job but then find this idea and find a student and there's a nice collaboration and that willing to come on and take a more active role in the company to both parties benefits. And so there are people out there looking, you know, maybe are open to another, taking another career or taking on another job. How do you blend that together and not cause a problem that I was talking about earlier where they're forcing themselves on the customers.
- Interviewer: Yeah. I talked with Chloe about that at a students have like a huge workload and then they're not really, they don't want to have the extra work of joining like a startup because they also do not get credit for it. Yeah. I think it's a good experience for students to get this like knowledge of creating a business, running a business.

E. Appendix: Interview transcripts

- IU_2: Well that's one of the things I admire about that. A lot of them they're kind of special people, a lot of regards because I'm going to happen, it was all I could do to study, go to school, much less. Think about doing a startup on the side while I'm trying to do all of that and dedicated in every weelIU_2d and evenings and that. So they're kind of special people. They have that drive and I think that that will serve them well. Um, you know, in the longterm we give them the help so that when they get out of school, maybe they learn enough and the next startup there'll be better chance of success because they've learned so much.
- Interviewer: Yeah. Also like because they can apply their knowledge I think then you also benefit more from your education.
- IU_2: Yes. No question. Well, rightfully if they go out, it fails whey go out, they've got something you know, more attractive to almost any company that might hire them for an employee role. Right. I mean they got this wealth of experience that you bring to the company wherever you go to.
- Interviewer: Yeah, that definitely, yeah. I think also companies like Google, I think that you have a benefit when you say, okay, you had a start up before or you worked at a startup. Just because you get like this startup mindset and like people assume that you're more innovative if you work for or founded a start up.
- IU_2: Yeah. Agreed.

E. Appendix: Interview transcripts

Transcript Interview IU_3

IU_3: How did you come across my work?

Interviewer: So Göran said it would be interesting to meet you and then he send me a link to your LinkedIn profile, a Youtube video about the “Innovation genome” project.

IU_3: So you have seen some of the stuff right?

Interviewer: Yes exactly.

IU_3: Ok so does it seem relevant to you?

Interviewer: Yes. I am really excited to talk about it.

IU_3: So tell me what you are interested in and I will answer.

Interviewer: You are also working as a lecturer at Singularity University and so I am curious about this connection between students and industry. So did you work together with students?

IU_3: Yeah so Singularity is a little bit different. It is not a real. It is a non-traditional university. Students you get at Singularity are frankly these exceptional people from all over the world that come for a special program during summer. So yeah they are all students, some of them are just 14 years old. They created their own programming language, crazy smart people. I have worked with students there, I worked with young people doing startups to some degree but I would say I worked a lot more with UC Berkeley and Stanford than with Singularity. But I can talk more about Singularity if you want.

Interviewer: So my thesis is about university-industry collaboration and its effect on innovative thinking among students so it is more about students in California in general and so that I can compare California to Sweden.

IU_3: So university industry collaboration is the bigger picture.right?

Interviewer: Exactly.

IU_3: Okay so I think you want to get a sense of how it is different here in terms of how it is maybe different here in terms of how the univerisites collaborate with industry?

Interviewer: Exactly.

IU_3: I would say and again so that you don't think I am a Californian who thinks everything great is in California. I am from New York, and Boston originally and I always say I have studied this place like an anthropologist. So take it with a grain of salt so that is my opinion. I would say in the entire world Stanford is the highest in terms of collaboration between university and industry and I use a

E. Appendix: Interview transcripts

different term. What school in the world has the best connection between school and the outside world. And that is Stanford easily. Why? Just on the numbers. The number of people at Stanford who already start to know what they are doing, the number of people that lead it to startups, the number of people that leave and get great jobs at great companies etc. Then lower I would say is Berkeley. Berkeley is really good. A lot of good companies come out of Berkeley, people are players in Silicon Valley and at this point if someone wants to connect with me I can look at their picture and tell if they are Stanford or Berkeley. I don't know how that is. I get 7 out of 10 right. There's a look. "Yes I am confident". So Stanford is an unbelievable connection. I mean the metric here is.. people are graduating. how many startups do they do and not just startups, successful startups, unicorns and then big companies like Apple, Google, Twitter etc. Stanford is great, Berkeley is, I used to think they were kind of similar, lately I think Stanford is pulling ahead. So I can talk about both. I try to cover everything MIT for example is a great school but MIT does not launch that kind of startups like out here, which is part of my other thesis that it is not about technology. I am from Boston, I lived there for 8 years. Boston has incredible technology, MIT, Harvard and all those places but they don't launch these kind of companies. There is a business culture out here and it is unlike everything else in the world. I think globally the connection, collaboration whatever between universities and industry is suboptimal almost all of the time. The good news is that there is more that can be done.

- Interviewer: So you think it is useful for academia and industry to work together with companies for the students?
- IU_3: Yeah. Exactly. At Stanford and Berkeley it is seamless. It almost seems like a difference between the startup ecosystem and Stanford, it almost seems like the same thing. That's part of it. I also think flipping around a bit. The research that is done at Stanford and Berkeley. It's another Stanford Berkeley thing that I could put out is that you would be reading in the San Francisco Chronicle that somebody blabla won the Nobel prize for blabla. A unique approach for blabla. And I would say this is a Berkeley person and I would be right. So the other thing I would say is that the research done at Stanford and Berkeley, in my opinion, is both super-cutting edge ivory tower but everyone also keeps an eye out on the world. So that's partly why you also it's not, as we say, in turn ivory tower. You know, it's you can't go to Stanford and escape the real world.
- Interviewer: So you always have the business context when you do your research?
- IU_3: yes all around you. Yes I think that is a starting place. So you are also looking for things that you could... So what's the big startup. So Stockholm. That's like one of the tech centers up there, right?
- Interviewer: Yeah, more or less. But I study in Gothenburg so I think...
- IU_3: Oh Gothenburg, Yeah.

E. Appendix: Interview transcripts

- Interviewer: Do you know it?
- IU_3: Yeah that is the Göran connection.
- IU_3: So you are looking for transferable insights, ways, you are looking for practical but you tell me, I'll let you ask the next questions, I have talked a lot.
- Interviewer: So it's I'm trying to figure out like if students already have like this innovation mindset or if they develop it when they work together with companies. So I want to study the effect of like this collaboration aspect.
- IU_3: Yeah I would say both. I would say this if you think of who gets into Stanford or Berkeley. Right. Mm hmm. They are from around here. And they've grown up with this whole tech business world. Or they are the crazy person from Iowa. Like they've always contended a crazy person. And then they get here. I feel all relaxed and everyone's like them. My wife actually said this to me back in the 90s. When we were thinking about moving from Boston to here. My wife said Bill we should move, because in Boston, in any given room, you are the craziest one in the room. In California, you just another guy in the room. You know, I mean, the people that get into Berkeley and Stanford, I think. And this is why it's to some degree it's not as transferable. But there's still something they've got...Part of the reason they're coming are they like this idea of innovation and excitement and doing new things. But of course, I think also people get it. Once they get here as well. It's hard not to get. It's hard not to get swept up in the excitement about that I would say. But you know, it's funny. I keep this initiating thought in my head, like it's not like.. Okay Stanford and Berkeley are different in the following way, which might be relevant to you. It's not like you go to Berkeley and all all these companies out there do internships. I'll say that it's not about internships. That's not what it feels like. It feels more like you go to you go to Stanford. And while you're roommate is gonna do a startup and his brother is already running a startup. And if you want an internship or something, fine, we'll just make a call. There is one way that is the same. The recruiters that come to us. The recruiters come to Berkeley and Stanford just like they would anywhere else. I'm trying to I'm trying to find like really relevant things. You know, it's funny. I think one of the reasons that I'm just getting my mind around this is the reason the collaboration between universities and industry is so good here. I think it's not to do with only the universities or industry. It's the whole culture. In my work I've talked about this a lot. The idea that there's this very much of a yes before no culture here right now, I don't know you, but you could say to me, Bill, I had this idea for blablabla. Right. Like I'm making up the craziest thing I could think of. Bill, I think that, you know, women always brush their hair in the morning. I found a way to capture the energy for that and put it into a battery. Right. That's crazy right now. But if you said that to me, I would think like that's pretty cool. Can you do that? Here it's yes before no. And the attitude is anything's possible. And that's not just like inspirational. That's literally true. The range of things that are possible. It goes

E. Appendix: Interview transcripts

beyond our imagination. So I think now that I think of it. Universities here, an industry or business or all in the context of this very unique culture, where whatever your ideas are, it's almost like a seed, right? You drop a seed into bad soil that is not going to grow. You drop a seed here and the soil is so fertile that the worst thing that happens is you'll have a wild ride even if it fails. I don't know if that helps, but I know Berkeley and Stanford are very different, but that might be, there might be something good to learn from them.

Interviewer: Yeah, because I, when I did my interviews in Sweden, like often the company said yes, students have ideas, but then we don't have like the budget or like we don't, cannot push it through to channels and then like they have ideas but they were never implemented.

IU_3: Yeah. Well that begs the other question so much. So I used to work at Autodesk and we had interns and I've, I've noticed a pattern or someone told me about it and we have a lot of interns from Berkeley and Stanford, right? They come in, they do cool work and what's the whole point? Oh, we'll identify a cool project for you. Right. What happens is they do some cool work and they go back to school and nobody does anything with it. So the internship model, I am back to your interviews, the internship model, when you do projects, I don't think that's usually real. Like there's, nobody has the incentive to make those things happen. And again, even if it is a great idea, the kid, they put kids back at school, you know, and as in my other work, any large company is going to reject at first anything that changes things. So there's a lot of reasons why those don't go. Um, so I guess, um, one thing I would say, so what's the big, what's the big school in Gothenburg? Gothenburg University?

Interviewer: Yes

IU_3: How smart am I? I just figured that out. Um, so I guess you have like a chancellor or something, like who is it? A Dean or something?

Interviewer: Yeah, I think it's called Dean.

IU_3: Okay. So if that, if I was talking to that person, um, I guess some of the things I would say is I would say to him or her, you probably know the internships. They're, they're okay, but they don't really yield that much. I would, I would say the yield a good deal for the student, but it's really just helping them think that doesn't yield luck for the companies, you know? So, um, yeah, I, I don't, I haven't been involved with it many times. That type of university industry collaboration. I think it's more theater or poetry. You know, it looks good and sounds good but doesn't quite really, um, lead up to anything. I'll give you another example. My wife went to Northeastern in Boston. They pioneered this co-op program and now this stuff is everywhere, I think. But it was the idea that for six months during your MBA or undergrad, you go to work at a company. So that was substantive because then, then you there for I think it was six months or four months. So that, that's another model I've seen. I'm trying to think of...

E. Appendix: Interview transcripts

How do universities interact with industry? Like what are other things you've seen?

Interviewer: Uh, so like in Gothenburg I've seen that you have a project for like, um, yeah, two months. So the company gives you an idea, um, or you like, have interviews first and then you think of something, okay, this could be useful for the company then you like develop it. But it depends on the company if they give you something or if they tell the students, okay, what do you think could be useful for us? And then you work together for like eight weeks and you like prepare a project report.

IU_3: Yeah. Yeah. I'm thinking of something new here. I don't know if it exists. So if I, um, if I were, if I were the head of a mid sized company in Gothenburg and I'm jumping into, it's, this is part university part in general. I might say. So. So if I was challenged by the CEO and he said, how can I get the most out of these students, I would say something like this. I think this is good. I think I'm making this up as we talk, right? I would say this. When you recruit someone, right, it's a little like Google. Like when you want to bring somebody in, right? Because you want to get the benefit of that young. All that energy and everything, right? You and the thing I'm saying would attract people too, so let's, what's a big company in Gothenburg? Or just name one ?

Interviewer: Volvo.

IU_3: Yeah, I think I've heard of them. Right? So Volvo says, um, we'd like you to come work with us in this particular area, but we do things a little differently. For the first three years of your career with Volvo, you have a third of your time free to work on anything you want right. Now the reason I like that is, that's not like an internship where you come in and then you go back. Right? But it's also not just hiring somebody. And this happens all the time. You hire the most brilliant person and within three weeks they've been through orientation. They're already defeated, you know, or they're already, they're not going to be as innovative. So I think, um, and I'm literally making this up. I think if to benefit everybody, a university could say, well, we have this program with Volvo, you know, and when you get out to Volvo, you don't have to just do what Volvo says. You get to do your stuff for at least three years. You have three years, you get something of yours off the ground. I think that would be that be useful, but stuff, something like that. Anything to get away from, let's see. So what, what am I saying? I don't like internships. I don't think that we're, you know, recruiters come in that has to happen. I understand that. Um, what else? What else do they do?

Interviewer: Yeah, that's mostly like summer internships. Like this project work and uh, yeah. And then you like graduated and then you are hired. Yeah, nothing really more.

IU_3: And I'm curious, why did you pick this topic and what was interesting to you about this?

E. Appendix: Interview transcripts

- Interviewer: I was interested because like I am from Germany and there's always the discussion that you study for like, I don't know, three years or five years and then you graduate and then you like, you don't do anything. And because you just have your academic knowledge and you don't really know, how can you like help the company? And that's why I was thinking like how can you start like during university time to like, already get like the business context or like to be innovative.
- IU_3: Yeah. Well. You're in, you're in Gothenburg now, but you're from Germany?
- Interviewer: Yes.
- IU_3: Okay, good. Um, if we, if we think about Germany So Scandinavia is pretty good with technology. Germany I found this is, this makes it even more interesting. Germany, I've found, I've been always stunned and I'll be really honest with you with the lack of innovation coming out of Germany, you know. So, because so many brilliant people, rated technology. Right? But when you look at the, and again, this is one of my things, when you look at this tiny little area that we're both in right now the Bay area, you know, one of my slides, this 57 companies that are at the level of Apple, Adobe, Pixar, Google, Tesla, 57 of them, right? I think there's none in Boston. There might be one in New York. I don't think there's any in Berlin. Do you know what I mean? We have 57 and most other city have none. And so what's why, what's the point of that with Germany? I think it's a cultural thing also. Like, all right, I'll tell you what a guy said to me once three years ago talking to a German guy. I'm in London talking to a German guy. This is an actual conversation. I'm not even changing this at all. This is, it's funny, just as it is. I said, so Berlin, we know. Where are you from in Germany?
- Interviewer: Stuttgart.
- IU_3: Stuttgart? Okay. He's from Berlin. I said Berlin. And look, I already know nothing's happening there, but I'm trying to be polite. I just said Berlin. Great. I bet it's a great startup scene there, right? And you said, he said, you know, in the German actions, I guess it is. I said, so you have a startup there? And he's like, yes. And so, so what's it like there? Is it, is Berlin a little bit like Silicon Valley where you can try things and everything. That's what he said to me. He said, well, you picture a German accent. He said, well, um, you can try, but if you fail, basically you must leave Germany in shame.
- Interviewer: Yes. True.
- IU_3: Now. I hate, I hate it that you nodded so quickly there. And I said, I said to him, are you kidding me? And he said, yeah, now and I, and I'm so steeped in this culture. Would you say that's kinda true? Like, like failure is not considered a good thing there?
- Interviewer: No, it's not really accepted.

E. Appendix: Interview transcripts

- IU_3: Okay. So you know that if you think about Germany and universities, right? You know, some of the best research places in the world. Again, I'm sort of jumping your topic to the bigger picture. The reason, in my opinion, we have exceptional and unparalleled university and industry collaboration is among other things, this sense of openness. Like I've often said, it's not even a culture of failure and a culture of risk. We don't just, we just don't care about those things very much. We don't try to fail. We don't try to take risks. We just don't care that much. So I think that's another thing like, well if you think you said you get out of a German university and some of it's very academic, you don't have, um, yes see it's chicken and egg. If you had, if you had tons of startups and big tech companies, let's say in Berlin, in Berlin or Stuttgart, then the students would, would come in contact with those people more naturally. Right. You know what I mean? Yeah. So that's a tough one. Um, I like my idea. I like my idea of the get out of school. Would you like, would you like that?
- Interviewer: Yeah. It's nice because otherwise you're just like, okay, this is our company. And then you're like forced like to work in your little area and you don't have like the overview and you cannot do anything new.
- IU_3: Yeah. If I were a student I would go to Volvo or something with that because they have a chance to work on my stuff. That's an idea. So you're thinking, you're thinking your, your, your thesis is about universities and industry in general, but you're obviously focused on places like Scandinavia, Germany, right. Just cause that's your background.
- Interviewer: Yeah, exactly. Yeah.
- IU_3: Okay. Um, yeah, I mean it's funny, I've been doing this for 10 years. I've been an innovation nerd for 25, but I, I am at the point where, I mean, I still have a great hope for innovation around the world, but to some degree I'm stymied. Like I, for my own work, I have arrived at the point where I know that the differentiator, if you just think about innovation is this mindset, right? Trying to get people to adopt that mindset is really difficult, you know? So, and that's wrapped up with the challenge, let's just say Germany, the universities and industry. Um, well now the, in Germany they do all the usual things. Internships, right? And recruiting and stuff like that.
- Interviewer: Exactly. Yeah.
- IU_3: Yeah. Another thing that doesn't work is like innovation labs. You know, where anytime there's a big building with lots of glass, I know nothing's going to happen there. You ever seen these things? I've been to so many of them and nothing happens there, you know? So that's another thing to be wary of. Yeah. Um, I don't know. It's, it's a, it's a tough problem. Um, what else? What other areas are you thinking about for that kind of collaboration

E. Appendix: Interview transcripts

- Interviewer: Uh, yeah, I looked at innovation labs like you mentioned and like the traditional internships and projects. Yeah, that's mostly it.
- IU_3: Yeah, there's not much.
- Interviewer: Yeah true. Because that's what I'm thinking. Even if you're like, um, then at Volvo and for three years you have time to work on your own ideas, but like if you don't have that mindset, like to be innovative to think about like how you could do something new then like it doesn't help you if they have like free time because if you don't have that like way of thinking developed before for some people that might work, but maybe not for the majority.
- IU_3: I have to go in a few minutes. I could refer you to someone at Stanford, someone at Berkeley. I've talked to them that. You still doing interviews, right? Yes. Yeah, I can. Um, cause they, you know, they might have a different view. Um, just so you know, they're going to be more positive about it. I feel like I'm giving you the real thing. Um, but yeah, so if you, if you email me, remind me of those people and um, I would say to send, if you send like notes from this conversation, I can think about it a bit more and um, then send you, yeah, cause it's, it's, it's kind of, there's not a lot of ideas out there. Like there must be something else to do.
- Interviewer: Yeah. Because that's what I was thinking because like your approach, get innovations, you know, because it's mentioned like doing something differently, thinking about how you use it in your way. And that's why I was like, okay, maybe students because they have like maybe new ideas that haven't been into business world and they might like approach something like objectively or,
- IU_3: Oh, sure. Yeah. Yeah. Well, again, young people think more like the genome than the older people cause of life just changes you in that way. Um, yeah. I mean I, I'm always one for having the genome stuff. I mean, my answer is to put the genome in every university.
- Interviewer: Yes because it was interesting because I studied innovation now for two years and I haven't like seen something like that.
- IU_3: Well, if you have, if you'd want, if you want to think about that too, I mean, I'm happy to talk to someone from Stuttgart or someplace. We've got some part about that. Um, yeah, this is, you've seen this is the stuff, genius innovators have done for millions of years. Crazy not to pick it up.
- Interviewer: You know, it would be really interesting as a guest.
- IU_3: Okay, great. Sorry, I couldn't give you more. I'm going to, I'm going to, if you email me to remind me to connect you to those people and I'll, I'll think a little bit more about it and saying essential mother thought.
- Interviewer: Okay. Thank you very much.

E. Appendix: Interview transcripts

IU_3:

Alright, thank you. Bye. Bye. Bye.

E. Appendix: Interview transcripts

Interview U_1

Interviewer: I'm writing about university industry collaboration and the effect on innovative thinking among students. And yeah, I want to ask you, what's your experience with university industry collaboration?

U_1: I mean my, my experience is, ah, it's, it's in different shapes and forms. I mean you have the very traditional ones kinda like, you know, from guest lectures, but that's what most do. I think the other experiences that I have is with regard to the project course, you took it as well and now we have it for innovation students that we currently running. So where we actually collaborate more actively and more in depth with the company or challenge from a company. Use that, that's, that's another experience. The, the third experience that I have is, uwhere we did sometimes also extracurricular kind of activities. You know, like company visits. We haven't really done that the last two years. But, uin a previous, we always kind of tried to organize for, you know, a company visit or companies go, uour students were invited for a, an innovation jam. So, uo that's, uthat is, that's, you know, that's also probably, let's say my, my experience. Use, so that, that's a little bit kind of, you know, how we tried to connect it back to, you know, education, at least talk about the industry, uuniversity interaction. Uthen, uanother thing is, is that we also have a corporate advisory board. Use, uthat's more for the KV program. IM has something similar but in a slightly different kind of way. Use where we invited alumni that are currently working in the industry, you know, to advise about, you know, how can we develop our programs, our education? What can we provide differently more to our students compared to, you know, some of the other offers out there. So, uo yeah, it's, it's, it's in different shapes and forms as at my, my, my own experience when it comes to working with industry and in this academic setting.

Interviewer: Was it the board's idea, like the alumni that you could do the product innovation course?

U_1: No, no, no. That, that was actually an idea that I had for a long, long time ago. Like, you know when I came here about 10 years ago I had already the projects and then would use more of a theoretical case, a large case. And then after two years I kind of changed, started changing to let's say real, let's say real companies. I mean, being new in Gothenburg I needed to develop my own network first. So that's an important part. But then when I felt like, okay, now I'm ready, then you know, I kinda like went out. So it's basically my, it was my own idea to do it in that way. And I was, I was raised up a little bit in that, you know, academic kind of setting where it's not about you know, training rigor academics, but it's more about training knowledgeable practitioners. So how can you apply theory and how can you work with theory and real life. But also how can real life support theory and tried to be good cases for that. So that's a little bit how I was raised and trained and then you know, that's also what I just want to do now in the lectures, courses that I have.

E. Appendix: Interview transcripts

- Interviewer: In the Netherlands, is it more about connecting students and industry?
- U_1: Oh let's say it's very problem based oriented. So you know, a lot of the courses that we teach at universities or even for that matter, also already in high schools is from the philosophy like it should be problem based. So there was a problem, we needed to solve it. How should we go about that? Of course, you know, there's a theory, there's models, but you also think about, you know, what you've got, your critical approach is critical thinking outside of the box kind of thinking. And that's been really kind of like heavily supported in the Netherlands dribbled down now to secondary school, not sure about primary school at the moment. But you know, and that's a lot of the universities, Maastricht, but also the university where I came from, Twente, they had a very much into the core of how they want to teach and how they want to train. And it's something that I like. Uuso I just kinda like wanted to adopt it here as well.
- Interviewer: Is Sweden different?
- U_1: Uh yeah to, to a certain extent. Like since it's more kind of integrated into kind of the educational setting in the Netherlands, it's easier to go do biopsy in Sweden. It's, it took more time to kind of develop then from an academic perspective, you know, you get more more question marks. What is the academic part of this? And so I ended up a few times in the discussions like, okay, you know, what is it that we want to indicate, you know, what is that we want to give to our students? Is it a thick book of theory or do we want to equip them for the future. So, and I'm on that, that latter ponds where it's a lot of, you know, some other programs even at Handels, they, they think slightly different and that's also perfectly fine because you need to have everything. You need to have this smorgasbord of different kinds of programs, different kind of profiles, different kinds of ways of doing. So academically it's been a little bit more of a challenge just to get it accepted in a way. They don't, you know, from the business perspective, it was some kind of education that I had to do as well. Like what can our students do? So how can they contribute? But I mean, now you know, now I've been doing this for 10 years and everything gets better and better. It's easier and easier to kind of convince them. Now companies are getting back to me as well. Like, okay, within part of this course, can we continue? So that's, that's also kind of like a positive sign. So there's a win, win, win situation in these kind of collaborations.
- Interviewer: So what do you think like is the advantage for companies to work together with students?
- U_1: That is a couple of things. First of all, of course they, you know, you hopefully get a high quality report on a problem or a challenge or an issue that they're facing. So they are actually getting a group of students doing an assessment, doing an analysis and trying to help them just to kind of like, okay, upush or get some advice or, you know, push a certain thing. Uso that's, you know, one hand academic. It's also that, you know, a few pairs of fresh eyes on looking into materials. Students normally think differently than the company. So that's also

E. Appendix: Interview transcripts

kind of like a good thing. So it's content related. Another thing is it's also kind of like coming from a company perspective, marketing related like, you know. Do I see, you know, a prospect, you know, coworker in this group, like, do I want to work with that student? Do I want to maybe hire her or him, let's say in the near future. So is there, it's very much just kind of like, you know, branding and, you know, HR perspective as well. I know that some of the companies are doing that, so they're looking at students like, okay, he's good or she's good. He or she as well, she's good but maybe not, you know, it doesn't really fit into the group. So I would say those are the kind of the advantages of, you know, the companies to become more visible, get a good quality report, have a different set of eyes looking into the material just to come, come from a very different kind of angle. So I think that, that, that's the value for the companies.

Interviewer: And do you know like the students that collaborated, if they had like really new ideas or was it more like, okay, we see you do it this way, how you could improve?

U_1: It's, it's, it's, it's both. It depends a little bit what the company wants. So these, these projects or these kind of collaborations are very often needs, need driven. So currently in the current course that we have, you know, we have, for example, Lync&Co one of them, one of the projects that they provided is, okay, think outside of the box, this is what we want to do and this is our strategy. We want to do something here. We have a few ideas. We want you to kind of come and challenge us. We want to do kind of think free freeing to think big things to think, think different and propose ideas. Doesn't matter how core QDR just proposed. So and then of course that that's the task that they have at hand and then, you know, make a selection and then focus on maybe one or two of the to kind of develop further. But sometimes the company comes also with a question like, okay, for example Lync&Co again. Okay. We have an open innovation platform, but we have a hard time attracting people to the platform. What should we do different? So it depends on the kind of questions that the company is after or the kind of help and support the companies is after I should say. So, so it's more need driven. They have a need to have a wish to have and they, they have a question. And then, you know, students coming helping with them, but it could go in very different kinds of directions.

Interviewer: But do you think it helps students like to develop like some kind of innovative thinking?

U_1: Yeah, absolutely. Because I mean, what I tell my students here is, is like, you know we train students writing business cases. You know, you're extremely good at writing business cases. For example, take the innovation management course, you know, you get a case to eight, 10 pages, here are the questions answer them. It's just kinda like, okay, take it, here's the theory, here's a case, dah, dah, dah, dah. And you know, you can do that after four or five years. That's not something that you have to learn. Like this execution phase. That's perfectly fine if you think about innovative thinking, and that's a little bit why

E. Appendix: Interview transcripts

we have this. It is about how to deal with uncertainties, how to deal with, you know, things that are not kind of like set. And I think sometimes the education that we provide is a little bit too rudimentary just to kind of too strict to to box in. This is also, you know, why the questions that you got. They were like, Oh, what, what is it that they actually want from us? So what is it that we are supposed to do? You know? But that's part of the learning process where you start questioning and I think, you know, when you want to think innovative, you have to question things. So why are things the way they are and why are they doing and why are this, why do they have a need help for this? And I think question is an important part of let's say also that you know, this innovative thinking. Then, you know, by proving them with like a big kind of challenge they have to kind of like, you know, be able to kind of operate in these networks as well. Like, you know, we have our demands from academia, they have the companies, they have themselves, they have other people that talk to us they, and sometimes we are aligned most of the times we're not so, but how do you bring these perspectives together? So, and I think that's also an important part is that, you know how can you mitigate all these kinds of different influences and how can you make decisions for yourself, you know? So that's, that's, that's an a, I think that's also an important part and also to understand that, you know sometimes you cannot trust the process, you know, for example, some of the things that were more around design thinking, you know, if that emerge you will swim. But I mean from swimming come and, but at least following instruction kind of process, it gives you some kind of guidance. Maybe you don't end up where you thought in the beginning, but at least you know you get a result. So allow that to happen. You know by time. And I think that's also something where students are not really kind of used to sort of like, okay, we have six weeks, we have eight, we have 10 weeks, this is what we need to do and how we'll be able to cut the cake. Okay, you know, you do this, you know, next week we'll meet up again and we'll talk about it. Okay, fine. And now you're just like, you're swimming in a big ocean like should we go left? Should we go right. I don't know. But I mean that's, so I think also these kinds of projects, the way we're trying to formulate it is, is we will help in that particular kind of way as well. And then sometimes the companies are pushing us, like, you know, challenge us, question us, you know, push us and that's what we want. We want to get your ideas and you know, so I think, you know, there's a couple of elements that I think definitely will contribute to a more innovative thinking from, from a student's perspective. So, yeah, so I think, I think the projects could be a good thing. I mean, I understand the students when they're in the process, you know, it's annoying, it's frustrating. But I think on hindsight when the course is over, if you start reflecting, yeah. But you know, there's certain things maybe I should've done differently, I could have acted differently. And it's also that kind of reflected behavior that I, you know, I think it's an important part of let's say, you know, innovations, where are we today? Why are we here? What should we have done differently? What can we do? You know? And not just to kind of like, they always say like, you know, a ship is safe in the Harbor, but that's not what it's made for. You know? And I think this is also the bit like when it comes to education as like innovative thinking, like, you know, of course it saves the kind of thinking in, you know, your own, uuuwithin your own

E. Appendix: Interview transcripts

education, you know, the academic work, your own theories and models and like that or from students like, you know, their own education, like, okay, the cases and stuff like that, but sometimes you need to be pushed out. UuI'm trying to be quite upfront with that. In the course it's like, you know, I know you get annoyed. I know you get frustrated on how you get fed up to that, let it happen. Use, so that's, that's the only thing that I really can do. And hopefully students can, you know, reflect back on that. So like, yeah, okay. I was pushed out. Uh, it was, I was uncomfortable, but you know, innovations are not comfortable. So sometimes you need to be, you know, in, uon, you know, in, in the seat, experience it for yourself and then just, ubut as long as you kind of go back and say, okay, you know, what's the learning from this? And so I think that those are, you know, at least kind of like reflecting on that. So it's kind of like part of let's say, Oh, I think you know how innovative thinking it's also connected to, uto, to this kind of, you know, courses, not only in terms of course the project itself, but also what I think, you know, educational systems, universities need to provide more specifically to students as well.

Interviewer: You mean offer them the opportunities to collaborate?

U_1: Yes exactly to collaborate and just maybe not have well framed kind of questions. And then, you know, because I think that's also another thing. Like, you know, if you start working, you will not have a well framed question. So, okay, yeah, you know, we need to do this. We don't have a clue how to do it, what we need to do. You go and figure it out and then you know, it's up to you. So it means that you have to kinda like, you know, see what is the context, is that the full context? Do I need to drive bigger? Do I need to make it smaller? You know, and that's, you know, come and get different kind of perspective. You need to liaise, you need to talk, you need to do self reflecting, questioning. So, and I think those are, those are important parts of it, you know, this innovative thinking.

Interviewer: I talked to companies, I had some interviews and they said, yeah, mostly students just approached them with already formed ideas and I was wondering, okay, is the student already innovative approaching the company or does the student build like this kind of thinking, during the collaboration, you know what I mean? Like what comes first? But I think the course really helped like project innovation, like to build this way of thinking.

U_1: Yeah. I hope so. Some will stick, some will will not but, you know, that's a, that's, you know, that is what we always have with different kinds of courses. But I think, you know, it's, it's a, it's a learning experience. Like, you know, they say like, you know, innovation is 10% inspiration, 90% hard work. And so and I think that's, that's I think that's very, very true. It's not always kinda like these light bulb moments, you know, innovative thinking, you know, of course, you know, you think outside of the box, you know, challenge what you do, you know, go out don't stay in the harbor, but go out and sail the oceans. But it's also about making, you know, making choices. And sometimes you're right, sometimes you're not.

E. Appendix: Interview transcripts

- Interviewer: First to know's role. What's your experience like working with them? Do you think it's useful? What they do like?
- U_1: Yeah, no, no, absolutely. I mean, I know Per and Ola already for a couple of years. We're working with them in different kind of course of different kinds of constellations. So I think, you know, they [inaudible] their ambition is very, very good. Trying to connect not only companies but also, you know, municipalities and the public sector. And then students can try to create this kind of like a hub, whatever you like about this as well. What about the spaces that they're trying to do, the interdisciplinary and in some that issomething very difficult for us to achieve in our educational settings because I mean we are Handels, we are Chalmers like, you know, come on. I mean, you know, there's this kind of, you know, these are the hard walls that we have around us. So especially in courses it is difficult to go beyond. So and I think there First to Know, you know definitely plays an important part in that as well. Like connecting back to innovative thinking like, you know, innovative thinking requires interdisciplinary teams, so you have to have people with different kinds of backgrounds. And I think that's where First to Know is, you know, they're trying to push that really, really hard or at least trying to facilitate as best as they can. And I think that's, that's very positive. So, and I mean these two gentlemen, they have a lot of kind of like networks, a lot of kind of people that they know. So they that way they they could provide a lot of kind of contacts and that is a great asset for, for many students.
- Interviewer: Yeah. It's also like really nice now for the master thesis. Yeah. Also like the hub because you have like so many different people like working there lectures. Yeah. Mm. I'm also like looking a bit at what first to know what they could do better. Do you think, is there anything they could do, like more like expand their portfolio or what they could do better?
- U_1: I mean the challenge that, you know, first to know has, is access to, you know, universities. So how, how to gett in to, let's say, the different kind of programs. I think, you know, when it comes to IM or K B. I think you, we have our connections, but I think that's more on, ah, it started with personal relationship. Now it's kind of like more, more, more on a program level. And I think, you know, if they really want to kind of push this interdisciplinary interdisciplinarity within let's say the offers, they should do it for the other programs as well. And I know that, you know, for example, Per is really, really trying hard, but I mean it's sometimes shut doors that he's kind of facing as well. So there's sometimes not the willingness of academics to work. Sometimes it's a little bit of kinda like, you know, the un-clarity of let's say, how these kinds of collaborations could potentially could potentially work. Then I mean sometimes you know, it could be good for them also to find a little bit more of kind of, again, the focus. So what is it, you know, what does the space now really about? So if I have a, for example, a societal challenge, I can talk to the space. And so nowadays they are focusing on different kinds of things and different kinds of topics. That's also totally fine, but maybe they can become like, you know, think a little bit thematically as well. And of course, I mean Per talks about societal innovation.

E. Appendix: Interview transcripts

Societal innovation could include a lot, depends on how you want to put it, but you know, sometimes it could help them a little bit. Kinda like with the profiling I would say. So. yeah. And I mean these two gentlemen are highly entrepreneurial. So and that, that's not always what universities are or can be. So trying to become entrepreneurial just to kind of, you know, pick up a new idea, just kind of go with that.

Interviewer: So universities cannot be as spontaneous?

U_1: No, we can't be, because I mean, we have certain rules and, and to follow, to follow and this, this, okay, this is what we can do and this is what we can't. And so that's, that's something that we have to adhere to. Since we are a public organization, we have our boundaries in terms of what is possible and what's not. So that's a, that's an important thing for us to think about then. That makes, sometimes entrepreneurial thinking different. Yeah. Different. And that's also a little bit different. Difficult as well.

Interviewer: But do you think that's why it's important to have like a mediator, like first to know that like it's not directly connected to university but like tries to connect university and industry?

U_1: Um yeah. But I mean, let's say the things that I just mentioned are also kinda like relevant, for first to know and the 360 space. Like, you know, they have to understand our situation as well. And I mean I think the fact that they can mediate is, is great. So because I mean it's kinda like expands, you know, the network that you can reach out. Some programs would need that. Some programs might not. Sometimes, you know, I have my own network that I can come and get an alliance as well. So it's also then like, okay, what could first to know, offer more or differently. I mean, especially when it comes to let's say, companies that are maybe not so used to kind of like working with university university students. It's good to have these mediators that you have a few people at first to know that have a kind of like understanding of let's say the academic situation, what is required. At the same time they can come and transfer that to let's say to companies as well as the other way around. It's like what does the company want? So it's sometimes it funnels a little bit so. So it's so that, that's, that's good. I mean Visibility, accessibility data, there important parts. Let's say what first to know needs to do what they need to think about and I know that they're trying extremely hard and academia is not always there yet to embrace that. But I think that's more academia that has to blame itself than what's for first to know is actually.

Interviewer: What do you think are the advantages for like a university to promote student industry collaboration?

U_1: I mean, let's say, I mean we're talking here about Handels where we are here today is, you know, they have, it's part of their mission is to increase the employability of students. And I think, you know, employability of students is of course the degree, but I mean that gives you an entry ticket so it allows you to

E. Appendix: Interview transcripts

apply for certain jobs. So it doesn't say anything about who you are, what you can do when you can't do what you ass, what you don't add. And so I think, you know, working with kind of companies from a university perspective, I think increase employability of our students. You can use these cases as a, yeah. But I worked with this kind of company. We had one of our course, we had this project and this is what we solved, this is how we go, how they will do it. So that's, so I think from university to kind of like allows to increase employability. I think another thing towards the companies, it is more that we become visible not only to the big ones like Volvo, SKF, but also, you know, the smaller kind of the medium size kind of organizations. So how they also can even utilize some of the resources that we provide. So I think that's another important part. And you know, it's also the brand of, of Handels itself. Like what is that we want to be known for? Of course sustainability, good research, but also good education. And I think there, you know, having this connection with, you know with companies is, is an important part as well.

Interviewer: So to show that the students are capable?

U_1: Exactly, if you hire students from us, you know, you have, it's a good hire, you will get the value for your money. So so I think there's also PR, branding, marketing kind of like comes, comes in and I think that's, then it becomes a little bit more and more important for universities to thinking in that particular way as well.

Interviewer: Yeah. And also because you said like medium sized companies do you see a difference between are like, do you think a company size has an influence on how willing companies are to collaborate with students?

U_1: Willingness?

Interviewer: Yeah. Yeah, I'm trying to like investigate if there's like a, what are the influencing factors in university industry collaboration? Is it a company size? Is it organizational structure? Is it like organizational culture?

U_1: I mean in those kinds of collaborations where, well, I've been part of that is kind of like a key success. A key success factor is I you can end up with as in willingness sort of the company. But I think it's more about, you know, one-on-one relationships. So so just to give an example, a couple of years ago we started the relationship with Volvo AB. I knew a guy there, he was positive towards the program and we kind of like, you know, we started developing, we did a lot of things in, in the collaboration. So that was part of the project. It was part of let's say a extracurricular. There was so many different kinds of things. And we started thinking about research projects what is it is you know, individuals to a large extent. So I would say like if there's an accompany the willingness through individuals to do this, I think that will really come and help. But then of course you need to find someone, somebody on the other side who is also willing to do this. So to, to collaborate. Um I mean company size, I mean we have both large and small and medium sized kind of, you know, companies

E. Appendix: Interview transcripts

in the project course. Cause sometimes you know, larger it can be actually be a negative effects because I mean yeah we have NDAs and stuff whereas smaller or medium sized companies are just like, yeah, I just want to group with students so that there's a slight, there's a slight difference as well, but I don't know how to think otherwise. Maybe in the, you here the type of, so you think about larger than a small, medium sized I think the possibility for small to medium sized companies to really get innovative thinking is it's a slightly higher than for larger firms. Because, I mean, if you think for example about Volvo or SKF, you know, they have their routines to follow their process to follow. That might sometimes stifled a little bit like, you know, what you can do. Whereas in small medium size, so small enterprises like you just have a look. It's just more of this kind of open openness. So but I think for, for a lot of these kinds of relationships, kind of like a personal relationship between the course responsible or the course person and the company on the other side I think is also critical. Yeah.

Interviewer: Yeah. What do you think that companies want to collaborate and don't know how, or is it more they haven't even thought about doing, collaborating?

U_1: I think it's a combination of both, I think. I don't, I don't think that, you know, companies sufficiently understand what we actually do. Okay. And so then it's like, okay, I didn't even know. Okay. Yeah. Alright. My students doing that. So I think there is a little bit of kind of a lack of understanding, lack of knowledge about, you know, how does education look like secondly I think, you know, the approachability of universities is also, it's not really kind of like good if you just tried to find somebody, you know? And I mean, you know, and that sets a lot of kind of companies also off in terms of, you know, you know what, I'm just leave it be. So I mean now at the university level there's somebody from for some better account or collaboration on the highest kind of level. So I mean maybe it's somebody that you can interview as well. And she's kind of like head of some kind of collaborations and she spotted the board of golgi. I think, you know, accessibility to us, universities for small to medium size enterprises is, you know, is, is very important as well. Or at least not kind of like a natural to go to partner. Okay. And then if they find us, it's, it's, it's difficult to find the right person. So, and then go back to like, why I think it's important that you have these kind of personal relationships because I mean if Per Ola and I didn't get along, this would have died off a long time ago, but at the same time, you know, what Per Ola and I are doing and all I'm doing is to kind of extend [inaudible] extended the migrants, more people know about it, what people are talking to them. So we get follow up with effects. Then it goes into more University industry, structural kind of relationships.

Interviewer: Because I feel like that my master thesis collaboration is really common. But like for me it seemed like the project innovation course for example, was something new like to work together on a project. But do you think it's more helpful for students, like the projects like to build kind of like an innovative thinking?

E. Appendix: Interview transcripts

- U_1: Okay. Maybe it is . Yeah. I haven't really thought about that kind of question because I w I would say the project is even even compared to the Master thesis even more practical. So where yeah, that could be. Because I mean in the master thesis that's academic, really clear academic, you know requirements that we have that, you know, students have to follow and have to do and you know, you kinda like use introduction methods theory, dah dah, dah, dah. Whereas in the project course you still have that, but there's more kind of like degrees of freedom. So I think the the company question has a more central role compared to the master thesis. So It could be, could be, and I haven't really kind of like thought of and reflected upon that could be the case. Yeah.
- Interviewer: Yeah. Because like the design thinking approach for example, was more about like, Hey, brainstorming, what could I do? Like master thesis is like more strict. Okay. I look into, into the literature.
- U_1: Then again, of course it depends still on, you know, the projects that the students have to do. But I think, you know, that could be the case. Yeah.
- Interviewer: And also when you're talking about, for example, smaller companies or larger companies, did you get the feeling that the smaller companies are more willing to implement the ideas? Like they were more interested in doing something new?
- U_1: Yeah, I think so because I mean like, you know, if you have a small organization, there's normally one or a few people working there and then if they bring up a problem, it's really kind of the problem for them. That's actual, that's important. That's just like, you know, we have to fix it. So then of course they have a student student group comes to this kind of advice, you know, there's a lot higher likelihood that they will do something about it. Whereas if you have a larger kind of company, they said, well, yeah, there's so many different things. I mean they can, they can still do the project, but it might end up in a nice drawer or somewhere, you know, cause normally when we work with smaller kind of companies, it's, it is a problem that, you know, they are attached to it for themselves personally that makes it also slightly different. Larger kind of companies could be, could sometimes be well as well, yeah. So yeah, maybe, maybe small kind of, you know, organizations have or have an advantage when it comes to, let's say development thinking, but as well as connecting it back to their own day at work to kind of really see the value of that. Um but then again, like, you know, from a company perspective, and that's also what I tell the companies, it's like, you know, don't just switch swimming. It doesn't mean that you need, you need to stop communicating to the group mate. You still need to have these kind of meetings, shorter ones if necessary. And just to kind of like, you know, see if you know you're on track just to kind of make sure that you know, there is the possibilities to at the end you will do something with this or you can do something. It's also down to the individual from the firm to make it happen.

E. Appendix: Interview transcripts

- Interviewer: Yeah. I think it's important to get their perspective because otherwise as a student you so many ideas and you don't really know, okay, do you, do they really need this? Is it like, can I really apply it?
- U_1: Yeah. And I know exactly, yeah. Yeah. Hmm
- Interviewer: Because at first with our project, like for the city of Gothenburg it was a bit hard because we had so many ideas. There was not like one person that actually was in the end, like kind of the customer. So we weren't sure is this really needed
- U_1: Yeah, exactly. Yeah. Then of course it makes it difficult because then you don't use that normally he's saying this, she's saying so and so and you know, you kind of like ended up a little bit in kind of like the middle ground. Yeah.
- U_1: Yeah. That were my questions so far.
- U_1: Okay, good, good.
- Interviewer: Yes. Yeah, yeah. It feels like that the students really profit from these projects because even if you have ideas, it's nice to get the practical perspective and also like to reflect but also to get companies to reflect on what they're doing like every day. Cause that's add like two interviews so far with companies and they were also, it's still important to get students to question how things are done or like why it's why it's done this way.
- U_1: Yeah, no, no. An exact thing. I mean this is going have to create opportunity to do that in that way. And then same time these companies can check like, okay, yeah, he or she is good and you're like, I want to hear more. I want him more her to offer to come here for a summer job. So that's a good for a full no. And of course also for us as a kind of like a program that offers a slightly different perspective
- Interviewer: But also like in Germany we have like a lot of internships and everything. That's also like a good recruiting opportunity. But in Sweden so far I just like saw summer internships, which are like really short kind of the master thesis. But yeah,
- U_1: It's not as institutionalized here in Sweden as in Germany for example. Netherlands has that as well, but not, not also, not even down in the same kind of degree you have. But ubut it is a great way just to kind of like support students with like, okay, this is who I am, this is what I can do. Like please hire me or you know, you have to hire it. So it is a good way. And to me it reflects well on, on like universities as well. Like, you know, especially when I know you have employability, so high in strategy. So then you need to be able to do something with that. And sometimes it's university as well, but I'm really kind of like a lot of practical, proven, practical things.

E. Appendix: Interview transcripts

Interview U_2

U_2: Uh, I work with kind of a lot of different students in different levels. Um, from BA first years. Right now I'm working, I have a BA course course and I also spend like my, like Homebase is a program called embedded design, which is the redeveloped program that I formally was part of called business and design. And that's where we've worked with first to know at some point.

Interviewer: can you tell me more about your collaboration with first to know?

U_2: Yeah, so now it's been a couple years since we last set up a project with them, maybe even it's been four or five years possibly. But, uh, but one, I mean when they came there was a, there was a 10 week course called the integrated projects in the previous, um, curriculum. And so the group of 20 students would be broken into smaller studios of four or five people. And then they would have a case and there would be a different case per team and first to know, brought us the space, but with the parentheses, the() space. And actually as a student I worked with them one year I did it as a student and one year I started teaching directly after school. So, um, so one year I was a student and one year I was kind of like the tutor for that team and maybe not even for that team, but in that class and yeah, so we worked with them for two full years in the same, but since then, I don't think we've had them. We didn't use them in the last two years of that, of that course. So it's been awhile, five years maybe. But um, yeah, but we always in that course there's always a client. So if it's not first to know it's actually another company we tried in that course, we try to, or at least in that curriculum in that course, which is not exactly how we do things now. But anyway, we try to have one private sector, one smaller company, one public sector like the city or something along those lines. And then, uh, yeah, so we kind of spread out who we work with. And so we've worked with like SCA, which now that isn't called SCA and um, well who else have we transport citizen has been a project. There's been a lot of projects cause it's five per five or six per per session. But yeah, so that's that course. But in general, the, what I teach has this, um, attachment to a real case.

Interviewer: that's really nice. And like the company gives the case with a specific problem.

U_2: Yeah, the company, it's a bit of a negotiation because of course we're hitting the learning goals too. And uh, and the curriculum has its own agenda. So the company, whichever company we're working with, there's a bit of a negotiation. I mean, of course there's a, there's a need already started and then, and then we try to meet it in a way that makes it so it's possible for a 10 week project or a 20 week project depending on what the project is. And then, and then also hitting the learning goals for the student, which, so on my side as a teacher, that's more important than, than like actually achieving the, um, the like delivering what the company says in the beginning. I'm always quite suspicious about that. Uh, what really works best is when the whole group who gets kind of inspired by each other.

E. Appendix: Interview transcripts

Interviewer: And do you know why the companies are interested in getting like this student's idea on the problem?

U_2: Most of the time they tell me that they're interested because they need a boost of energy or maybe they, and it's, you know, especially if it's one team in a large company, like if it's one team in a large company, it's a group that's trying to be kind of against the grain of the larger, larger culture. And so they need some extra energy for that. And they often want to get the same, they actually often want to also learn about innovation processes and design in this case. Um, so they're kind of piggybacking on the learning goals in a way, but not so, um, not, you know, not they're not graded. And then they also are often interested. I mean, often I find that my students create really good arguments for them to go to their boss and their boss's boss or their boss's boss's boss. So it's like kind of a really good positioning in a way. And that is like what really, yeah, because the students have more freedom to look at the problems from up from and flip it over and they don't have the same, um, like they're not like indoctrinated into the, like they're suspicious of the company instead of the doctrine or they're just naive. They just think that all companies work this in an innovative way and then that kind of thing. So, which is a very positive thing for, for the group. So like the contact client. So most of it I think is about energy.

Interviewer: So that it motivates to have like the young enthusiastic students?

U_2: Yeah, yeah. And smart and, and, and a team of five, like the thing that I get to offer, you know, is a team of five working 40 hours a week for a certain amount of time. Thinking about it, thinking about it from a very particular direction but still not, this is if it was consultants it would cost. Like if they had me do it, it would cost a lot of money. So, um, if they take it as a learning thing, it's kind of a nice thing. But then with that, I'm very nervous also about the students being exploited. Um, I think that there is something going on with that that I, that actually bothers me a little bit, that the students are not paid for this, that these companies are gaining quite a bit of energy. Um, so I'm getting choosier and choosier on which companies get to have them in a way. Yeah. Because you know, it's free labor and the students are graded, you know, it's not, the power dynamics is pretty intense. And in general, like most, most of the coaching is saying, do not answer the client what the client is asking right away. Answer to what the problem is answering. Because they just want to please, they want to get a job afterwards. It makes sense. But this is not why they're in this learning environment. Their job is to do the project now, not get a job later and they trust that, you know, but they are um, very, um, kind of easy to, to get convinced that that's why they're doing these projects.

Interviewer: To bring them in touch with companies for later connections?

U_2: Yeah. And that, but it also happens and it's true and the reality is, is what I have seen in the last five years is actually if they don't are too, if they're not so pleasing to everyone, if they like actually do the job, they have a much better chance of getting a job later. So they actually do the project and surprise, you

E. Appendix: Interview transcripts

know, like don't listen and go against them or do a good argument. Then there all of a sudden they show their value. Um, while if they just say yes to everything and just deliver as an intern, they are an intern. I really pushed them, but it's hard. It's hard to get the student. Uh, it makes a lot of sense in particular it depends on different cultures and stuff. My students are very international so like there's some cultures that are easy, even more or if they're non EU citizens, they really want a job and stay or you know, there's like extra pressures. Yeah.

Interviewer: But did you get feedback from the students? How hey like uh, used, uh, this course if they like felt okay now we could apply knowledge. We felt like we were thinking more about what the companies could do.

U_2: Hmm. Um, well of course we got feedback from the students cause there's a course evaluation included in course. Um, and it's interesting because you got me here in this, like I've had this gap year between like embedded design and starting up again in September and now I'm only working with the BA students for a year. So, uh, which is very different. Does not have practical cases necessarily. I mean, we have one, but of course it's much more handheld than the master's level is, um, but yeah, I mean the students, um, I do get every once in a while I get an email or something on LinkedIn saying like, Hey, by the way, this healthcare module that we did with you, I was, I was really mad the whole time. But now that's all I do all the time and I'm completely prepared. Uh, I've gotten a few of those. I mean, I guess no one who's gonna who only in evaluations do they tell you the negative stuff, right? They don't come back. They don't bother to talk to you again if they thought it was awful. But in general, I mean, my group of students, they all, um, almost, you know, they all, almost all of them have jobs before they leave. Um, and at least at the market before Corona, they were in high demand. So, um, yeah. So I think that they think that it's really important. I think that they also apply to this program because we make this as a promise, a lot of real cases compared to like, and even at the school that I teach. So there's three different versions of, of master's program at HDK. One is called child culture design, so it has children at its center and one is just MA and design and that one is very social. It's a very social design situation. But um, they don't work in teams unless they choose to and it's a bit less, I wouldn't say less practical but less involved with like, um, they have to find a client and they don't necessarily, they're not like embedded into an organization of some sort. So the embedded design students are choosing this versus choosing that other, you know, like, so even if they like just the school, they have the option, they have this option. So they are kind of clear on that part that they want to be like this word embedded that we now named the program. They want to be from the inside collaborative, but still a Trojan horse when it comes to the process.

Interviewer: From your perspective, why is it so valuable for students to have like this company interaction before starting to work?

U_2: Yeah, it's interesting cause one student, one previous student who who's actually German and is trying to stay in Göteborg is struggling little bit to get a

E. Appendix: Interview transcripts

job in Göteborg. Um, and it's because she said that they always want, I think it's a language like there, there's an excuse against the Swedish. Um, and they say that she's not experienced enough. They would like her to have been one year experience out of school. And I actually would love to argue with those interview people. Like in fact I might even see what, who they are and invite them into the new program because I would like to see, uh, I would argue that they've had two years of experience of practical experience in the field. Um, guided by, you know, it has not been what I think what it is, is that particularly like out of business schools, it's a lot of theory like writing papers and this kind of work is very much, especially to the design work very much. They of course you make a paper at the end, but there's an actual like practical problem solving situation happening. So they make ideas and suggestions and possibly solutions to things or, or whatever it needs to be designed or they know like a game that makes it work or a work workshop experience or things like that. So I think it actually makes it so that they're stronger because it's not in theory, but it's uh, I mean it's still, it's not like the same as working 100%, but it's close because especially the design. So I mean this is also kind of very much my discipline. So design is very practice based, very hands. Like right now with Corona time, it's kind of hard. It's about materials and smelling things and your hands wet while you know, management studies, it's about reading books and then arguing about it. So I think that that, that's the reason that they, that it's a plus, but it's actually like making the theory, um, experiential.

Interviewer: But do you see like a difference, like a development of the students before the course and after the course regarding innovative thinking or like creating ideas?

U_2: Uh, well I mean, yeah, of course. I mean any two year, any two year master's program will have like, uh, before human and an after human. Um, yeah, I mean I think that I, that they are definitely, um, I mean I think if you're, if you had the pole of like capable of innovative thinking on this side and this side is, is not, not very comfortable with that. I think my, the students that apply to the design part of this, want to be drivers of this very creative thing are like maybe already close when they come in. So I think they just get better. So I mean unlike like, I think first to know also interfaces with other programs that are not quite so, um, built to produce this type of thinker in a way. Um, so then, then I think it's more radical what first to know is doing than what what I'm doing. But, um, so yeah, of course they get better in the two years or after the course or after the experiences but I think that they've applied to do this in my, in our case. And they all come in with a portfolio. So it's, so we're also kind of, uh, judge them on entry on, not on like if they've done it already, but if they're capable. So, so in a way like they definitely are already convincing coming in.

Interviewer: And how would you see that? Like looking at the application?

U_2: Well, yeah, so the application process is that they have a like five image portfolio, a CV and a motivation letter and a one page reflection on the portfolio. So we get a lot of information from them, like what, what drives them, why they're applying what they've done before. That's kind of interesting to add

E. Appendix: Interview transcripts

into the dynamics of a 20 person classroom. Um, yeah. And then also how they like visualize things and we don't necessarily grade visualization as high. At some point with embedded design we will. But this year we were kind of, we're trying to figure out how to stay open because we need to have, have, um, we need to have them have some form of designerly, um, prerequisites per se, but we can define those. So that's why that reflection on the portfolio is maybe even more convincing than the images. Cause if it's like, if they've done like a bunch of design thinking workshops and they have some images of a bunch of posters, that's not a very telling image, but you know, it's not unique next to another one. But at the same time it gives us an idea like when they write about it, Oh, they've had experience of doing this and this and this. That made sense. So I mean, we're not necessarily like, like if they're, I mean, if they have amazing graphics, of course that's a very good plus. It makes it more convincing, but we're not, um, we're not trying, we're not necessarily, um, we also want to stay open to more than stereotypical traditional designer for this program, if that makes sense. It's really, actually, it's a really hard process. We've only done it once with the new program and of course, it's going to be evaluated next year because we're find out who came and it's a learning process and everything and we just reinvented it. So, um, yeah. And I mean there's all kinds of internal stuff happening too. We don't want to compete with the other two programs for the exact same students, you know, so, yeah. Yeah. Yeah.

Interviewer: And like from your perspective, like from the university perspective, why do you provide students the possibility to get in touch with companies like to get this practical experience?

U_2: Well I, I think that it just, the more practical the education is, the more bodily, the more experiential the education is. This is my form of pedagogy in a way. Um, the more ability to actually take these theories and move them into something new. Um, so that's why I'm driven to do that. And I think that it becomes all of the negotiations between all the people make it so that a really good learning experience happens. Cause even if the client doesn't show up, that's actually positive for, for the learning outcomes sometimes. Like even if like it ends up being that it doesn't work at all for the agenda of innovation studies, like if the, if the like innovation study process that was tested fails, I find that very interesting. So, um, you know, so cause I don't, I mean I don't quite trust the fads or the, or the, you know, the buzz words as much as I trust that using this kind of like creative thinking needs to reinvent itself and you know, like there's not one size fits all. So that's also a great learning for someone who's going to become a design consultant and then going to be going into all kinds of companies like three or four a year or five or six a year or three or four projects at once. Versatility. Yeah.

Interviewer: Yeah. So you see like differences because you also said, like you work with, you try to work with public sector, private sector, the city. So do you see the different, like the difference, like,

E. Appendix: Interview transcripts

U_2: well, I mean, yeah, there's different like, uh, of course there's different criteria and motivations. Um, like in healthcare, like I like working with students with healthcare because one, one of the crude criteria is, is it's not just about saving money or making money, it's also about, uh, lessening human suffering or lessening stress. Um, uh, so I like that. I mean, so there's different kind of, there's different criteria, but every organization is a small town full of informal and formal powers. Like it's also very transformed, you know, it's like, um, you know, working with design inside an organizational context can, you know, it can be a city size, it can be a small four person firm, you know, like there's still all of the relationships that need to be understood and all the different opinions and all of these negotiations and all these different rules and social norms. And so, yeah, of course it's different, but it's not, but it's, uh, the gist of it is not different, if that makes sense. It's just kind of different, more different opportunities or modes of manipulation or modes of doing things that I find that's different. Of course. Yeah. And like idealism levels, you know, inside like Volvo, the engineers there, they're just like, no, yeah, we're trying to get this out on market. While in the city of Göteborg, they are trying to make that they have a goal of democratizing their communication platform or whatever it is. So I mean it's just slightly different, uh, starting points. Yeah.

Interviewer: And also about the like then you talk about the starting point and ending point or like smaller companies may be more open to implement your ideas or like the students' ideas?

U_2: Yeah. Yes, yes. It's interesting because my students, I think that this is the truth that um, the smaller companies are like, they not only are open to implementing them, they probably are implementing them while the students are with them. Like they're probably co-implementing things. Right. And I find that really exciting. But it's interesting, the last two rounds of students have chosen much bigger companies while they're in school. So, I mean when I've given them a choice, sometimes I also give them like a buffet of people they can work with and then and then and then they choose. So actually the last couple of rounds of that from the previous program did not go with the smaller company. I don't know why I would, I would as a student, I would choose that for the reasons that you say. But I think this back of their head, they want a job situation and they some, I think they just sometimes think that some companies are too small to, to add people. But I don't know I think that that's a interesting, but yeah, of course. I mean the bigger the company, the more um, years it takes to implement things.

Interviewer: Yeah. Because there's just so much hierarchy and like, processes

U_2: yeah, but I think that the, that the discipline that we work with, we are kind of adapting to that. So in those companies it's more of a proposal or a really good argument for the team to then go to their boss. I mean that's also depends on what they like. There's never a set, this is the thing that's maybe interesting with design. We have a starting brief and we have this need that they want to. And that may be, there's like a solution idea in the beginning, but design is very

E. Appendix: Interview transcripts

suspicious of early decisions of solutions. So if a client comes to me and says, I need you to build this thing, this software thing or whatever, I will probably spend half my time questioning around and looking in the field if that's the, if that's actually the thing that needs to be solved or is it actually, is that a symptom to something else or there's something faster that will actually get to it. So this solution thinking that's kind of engineering in a way like an engineering brain, if I stereotype it, um, that's part of the discipline of the, of the discipline. Like design basically is kind of suspicious of solutions until the research has been done. And by research, I mean like interviewing in the crowd and, and uh, looking at observing and talking to people in gathering needs and then kind of analyzing and making sense of the needs of the stakeholders, I guess I would say of the problem area. So, so in that case, then none of my students know where they're going to end. Like where we start and where we end. It's not, I mean, very few moments is that, I mean, of course they can say no actually that was the right need we are going to fix that. Of course it can be that, but chances are they've moved to some symptom of that or some greater problem of that or something else.

Interviewer: Is that the design thinking approach?

U_2: I mean that's one that's like the, yeah. So if design thinking is like the daughter of design, um, then it's like a procedural way to do the design process. So yeah. And my students possibly are facilitators of design thinking processes depending on who they're working with. They are designers of course, but if they're working with a bunch of people who don't have the practice of design where they have years to evolve, then they possibly are using something like design thinking or sprints, Google sprints or, or all of the above. All of these innovation processes that make design feel like a bite sized burger.

Interviewer: And the companies are they open to it when they collaborate with you?

U_2: I mean, I mean that's a very biased answer though because I approach people that are willing to work with my students or, or, and I vet them, you know, so like if they come to me, I, there's, I have a at least an hour conversation to see if it hits learning goals, you know? And if they have the time, like if I'm asking them like in the healthcare projects we go in and we, there's a whole process of trying to get projects inside Sahlgrenska hospital and we go in and we have like an hour long speech of like this is what we need from you and this is how many hours you're going to commit. Please talk to your boss. You know, like all of this, we kind of do a lot of so. So yeah, by the time they get to the students they're willing, cause they've kind of already gone through a rigorous selection or they know someone or you know it's coming from the network, you know. So I mean cause it's not, I mean in one year maybe we worked with, I mean I don't, I have 20 students per class. So when we were full up and running, that's 40 students and they work in teams and in that year they might work with like both rounds, 15 companies. So it's not like I'm not like filling a hundred. And then of course some students want to have control of that. So they are also like part of their

E. Appendix: Interview transcripts

learning process is to go out and find the company and then I am more of a support.

Interviewer: So like part of my thesis is also to look at what first to know could do better or what they're doing well. E.g you stopped working together with first to know was there, like a specific reason for that?

U_2: Hmm. I mean, the main reason for that is, is that I don't have those types of students. Um, but more so, so I don't have students to give them in a way. But I also kind of, if I can be Frank, I also question, I don't really understand their business model. Like I don't understand, um, why I should go through them to get cases. I mean, I understand if we like are friendly and they have a case that may need some of my students and I find you to fill it. That makes sense. Right. But I don't understand how they, how they make it. Like how do they, like how did they put bread and butter on their tables? Like, yeah. So they're like, so is it that the client, I mean I have some assumptions. Um, is it that the clients pay them to find students? And then I wonder, and then it kind of gives me this questions about this exploitation of students who are not being paid, so there's this like moment of like, but who, who is benefiting what in this, in the relationships. But at the same time, if they have a project that fits the need of the course and I haven't completely filled it, they're one of the first groups that I say, Hey, you got something on your plate. So I mean, I'm very willing to collaborate with them but also kind of compete with them, cause part of my job is to do that is to go out and find clients. So, so, so yeah. So that part I don't quite understand completely. Like why I should go to the, I mean I understand why I should go to them and I'm friendly. Don't get me wrong, I'm friendly, but uh, but who is, yeah. Is there a payments and, and you know, like, and there must be, right. So, but I'm not getting paid to do that part. You know, I'm getting paid to do it from a pedagogical point of view, but they're not, they're also not pedagogues. So I'm not understand. I don't completely understand if there needs to be a broker.

Interviewer: How do you find your companies for the course? Do you just approach to companies or how does it work?

U_2: Yeah, I usually, um, approach, um, usually there's someone that knows someone that is interested or it could be like through Per and Ola, and you know, like it also could be like, Hey, I'm missing one more case. Do you have something that you need, need filled? And then I always try to provide them a thesis student or you know, or like, or I at least put that in the buffet if they have something going on. But, um, you know, if a thesis student is because the thesis students need to look for themselves, but sometimes they need more help. Um, so yeah, it depends on the course. So, and I'm not 100% sure in the new program where I could fit in first to know, but of course, um, of course they are, they are part of this network of people. But I usually go, I mean, I actually now I go more often to other design consultants. So, so like in the last five years that has kind of boomed enough that like, there's alumni from the program and um, and they have a client that needs extra help or can't afford it but really has

E. Appendix: Interview transcripts

the need or you know, so and then also the students get, uh, it's a win win for me because the students then get also a design consultant that's out in the field as a contact. So it's not just that they're inventing everything, but they also get a mentor, which I find that system works a little nicer for the students because then there's someone to like, no, no, you did it right. Good. Someone that does it every day. Because it's a, this kind of work, it's kinda, it's against the grain. It's like telling managers that they've been doing things stupidly, it is intense to be the person kind of bringing it up. You know, a lot of it is training. They're like, okay, no, I'm right. And it's with people who are used to being right, like head doctors there is a lot of like hierarchies at play there. So yeah. So that, I mean, so with first to know, I mean, yeah, I mean I maybe having a better, like I don't know, like having on their website like more than what they've done, like more up to date. Sometimes I go to their website and I don't think, I mean I don't, it doesn't look like it's been updated for awhile and then I don't possibly approach them, but one of them approaches me every three or four months or something. So in some ways I think they're probably frustrated with me because I haven't landed them something for a while. But if they don't have a case that works for the pedagogical reasons, if the students are not interested, I can't, like I can't force, um, the situation. So, and I have, I haven't had a moment where it's been clear in the last two years. I haven't had a moment where it's been clearly my decision and it works. So, and that's just because of the program situation. So the last couple of years have been very interrupted for my work too. So because yeah, cause I had this, like there was no students, so we didn't have any masters level students come in for two no, it may be, there was, yeah, two full years. So that meant that I only had a one one class all of last year. I didn't have first year and now I have known this year and next year we will start up again and I only will have first year. So like when we're like, so this has been the last, this has been the time that has not, we have not employed the group first to know. And for the BA level they are not, it's not at all the same curriculum.

Interviewer: So you start collaborating on master's level?

U_2: Yes, being able to work with them and to, to help them help their clients. Uh, they are a, yeah, it's the master's level that I need to do that. Like the BA level is learning how to like build furniture. Like it's a much, um, yeah, I don't think that the BA level is, um, I dunno. It's interesting. Do they work with the BA level? I think they pretty much work with MAs or at least graduated MAs.

Interviewer: Yeah. I think at Handels I think it's just master level.

U_2: Yeah.

Interviewer: But I'm not sure like if they also have it at a bachelor level, maybe because also professors are more open like at master level. Like to get this contact.

U_2: yeah, I would imagine that, I mean usually the BA level possibly in the thesis, but before that, I don't think BAs are ready to kind of take on the agency that first to know is asking of the students.

E. Appendix: Interview transcripts

- Interviewer: You have to be very self disciplined.
- U_2: Yeah. And to, and they have to interface first in a, you know, like they have to be self, um, self. Uh, engaged I mean I don't know that first to know has enough time to do all the checking and you know, and be at every meeting or,
- Interviewer: yeah, I got the feeling they don't really want to be there all the time. So they give you the responsibility because I had one project with them. It was a similar course to what you talked about where you have like one company yourself a problem for them. And like it was mostly the group that did the work and you had maybe one meeting in the beginning to set the ground rules but then it was up to yourself to like and everything.
- U_2: Yeah, absolutely. But yeah, so my main, uh, I mean, I don't know. Another thing, I don't know. I also don't know. My other question is, I mean, I have some like questions a little bit, like how is it, I mean, I can imagine, I mean, there's a big difference, you know, since I kind of do some of the same job, so, so, you know, like that's part of it, right? But, um, But of course I could see moments where as an academic, I need to cut that down, you know, cut that like that, seeking out stuff faster. So that's a benefit to me, right. To use, to use this brokerage, if we call it a brokerage firm. It's interesting because with the space, the pro, the, yeah. So we had the, I had a project with them and we asked these questions and they didn't really have good answers. And this was five years ago now I'm sure they have a lot of good answers. Maybe it was even six years ago, 2013, I think. No, 2014, um, maybe even 2015. But anyway, but, so my questions are still kind of very founded in that experience of being a student where we we did a project on them and I was, and we were very, we were five very critical humans. So there is that, I mean we, we, we questioned whether or not they needed the space or not, but Yeah. So, so maybe having, I mean for improvements I think having the website Mmm. Designed by an actual designer and make it kind of flashier. I mean this is, this is kind of a simple trick and then have like it would be kind of exciting to have the cause now it feels like a blog a little more or I haven't been on it in a while, but the last time I checked and maybe the blog part could be about, you know, like potential companies that are being vetted or you know, like some kind of like, cause I would love to hear about that. Like, I'm not necessarily interested completely in like the proof anymore, which maybe is a new thing, but like who is, who is like next step.
- Interviewer: Ah, okay. Yeah. What the plan is?
- U_2: Yeah. Who is next up or who is looking or you know like um. You know the like, yeah. So if it's a bunch of apartments, it's not, of course we need to see the successful sold cases, but I would like to also kind of be able to quickly view the portfolio of who is, who is kind of on the chopping block or being vetted currently because then cause then I, cause my position is also doing that cause then I might be able to get on board faster. Basically. We haven't been able to connect our timing like they come to me and I already have filled it like I've already dealt with it or, or they come to me and I'm not at all ready to do that.

E. Appendix: Interview transcripts

You know? So and I mean, yeah. And as I said, I don't have like a, I don't have a hundred students. So it's not like it's, it doesn't take me very long to fill five projects when I give myself these criteria one is inside private one inside. Yeah. Yeah. It's just fine. Yeah. It's just fine for that 10 week course. Uand then it takes a, I mean, and that's the other thing. It's been getting easier and easier to do that.

Interviewer: Because it's word of mouth that companies come to you?

U_2: Yeah it's a lot WOM, which is probably how first to know is working too. Yeah. But I mean, of course, and then maybe I should be like, if there's somebody that I don't interface with, maybe I should give them first to know's contacts. But I mean that, as I said, we'll see how that goes with the first year of embedded design. So yeah, because right now, like it's a very different curriculum than the B and D program was the business and design program.

Interviewer: So business embedded starts this year for the first time?

U_2: Yeah. And it's that, and it's a very, I mean, it's been redeveloped and redesigned completely. So maybe in the last 10 weeks that, I mean now we have like one course is private sector, one course is public sector. And then you have this, the second year is basically going towards theses which is when I probably can get first to know involved cause then I need this buffet. Right. But so the first year I'm, I mean I might not even the first year I'll be, we'll see what happens with it. I mean I haven't thought past the first quarter, you know, cause every course is new. So you know, let's survive one and then get to two. So spring semester next year, I'm not at all like I'm inside. I'm not like trying to figure that out right now,

Interviewer: But just the first, the first year. Is it also with projects or is it more like first theory?

U_2: Yeah, but it was projects, but probably more, yeah, there's always a practical project, but it's probably that we will have one case for the whole group and there'll be five teams working on one case the same. So instead of being like separated into like where there, so there's more. And then for pedagogical reasons that's more exciting because then they can kind of compare and they can have completely different agendas and answers and everything is fine. And then whoever is the client that is a good thing for them too. Cause then they kind of skip this broad analysis of the situation. So that's probably how it's going to be. But the very first course, the one that I'm working on now of course is an introduction to all of it. And so we will, well we will have a case but we're actually going to have them intervention or inter or study aro like the organization of the school of the art school so we look internally at us. So which is going through a merger right now and it's super exciting for organizational design. So like that's, so that one will be in there, but we'll hold their hands more now of course, in the beginning. And then slowly by the second year they're like, we're trying to make them as much autonomous as possible. And

E. Appendix: Interview transcripts

then that's when they can interface with. That's when I always have given them first to know as people to go talk to like you have done. And for that case I think it works really well. This situation where then it's like also the negotiations between the student and the and, and first to know and where it's my job to like just like, okay, is that good enough? You know what I mean? Like it's whereas if I need to make sure I'm hitting particular learning goals, I might need to be a little more in control of which company, you know, like, and maybe need to have my own. I mean it also helps a lot to have a really good relationship with whoever is the client so that if the students don't show up or if they do show up or, you know, so some of it is also that like sometimes it does, it does have to be someone that I have built a relationship with. But not in the second year. The second year is when I where my role is to step back more. And that, and that has been the last couple of years. We have I have talked to both Ola and Per about if, do they have anything the students haven't taken them up. But they were at the buffet of choice, but they also, the students at that point have, you know, they're supposed to build their own versions. You know, your, your thesis should be from your own interests and your own research question.

Interviewer: Yeah. But that's also nice when you do your thesis, you already have an idea of what you want to do and that image and then you can let go there and negotiate what do you want to do and just like that. It's very good.

U_2: But I think that's also really good to do from your position and not necessarily have me mocking around in the middle, you know, cause you know, I don't need to cloud that relationship. That relationship should be built on its own, in my opinion anyway. So yeah. Does that explain anything to them? I feel like I was a little mean to them. Yeah. So I mean some simple things like a website that made it so that when, when I'm, cause I can't actually say which part, which when's my time, or at least this next year, I can't tell when my timing is because I'm just swimming with my head barely above water for all new courses. Nothing is done in a procedural way because there's no procedure. So maybe in two years there'll be like some like I will contact you in October and then I will know this. But for now I'm, you know, burning, putting out fires. So yeah, no, no, but that's kind of, yeah, that's my main, yeah. So you are a Handels student?

Interviewer: Yeah, I'm doing the course in innovation and industrial management.

U_2: Okay, cool. And you took a design thinking course?

U_2: Don't know that. I know this. Yeah. We'll select the course. So first we had like some information about design thinking, how it's working, and then we met with the first to know and then we did a project about the city of Gothenburg. Oh yeah.

U_2: So this is the, this is the course of first know has been involved with for awhile.

Interviewer: Yeah,

E. Appendix: Interview transcripts

- U_2: Yeah, yeah. When I did the study, when I was a student studying them, like you the day we went I went and saw the, the final presentations of that course I think. Yeah.
- Interviewer: So you had to look at first to know when they started. I think they started in 2014.
- U_2: Yeah. Yeah. So yeah, I mean, I don't know if it was, it wasn't first to know that we were looking at, but we ended up looking at them. They wanted us to look at this. The space is this common platform, but we, they didn't have anything there for us to look at. So we then ended up looking at first to know, I mean, they had stuff and we were inventing stuff. It was a good project for the first year of a program. But we also looked a lot at first to know, we actually called them to change their website then too. So my so please take that as a grain of salt that my my opinions are a little bit In bed with that project in a way. So I haven't seen, I mean I have of course other experiences with students and whatnot, but in general I haven't had a ton of experience with them since then. Okay. So take that with a grain of salt. These are still kind of not, I mean I haven't like done a study like you now or haven't read items lately.
- Interviewer: Yeah, sure. Yeah. Also when I talked to Per probably he knows like what the, what the, what, how it looked like five years back.
- U_2: And then of course, and I think, I mean let me go to the website cause I remember we we, that was a main thing. I think they may, he may have done, they may have, it may have done like what we asked for the website, but now I think I changed my tune a little. That would be interesting. Where, what, to have some kind of, what's going on, what's up next or what's it, what are some potentials or even if it's dreams I can get on board with some dreams, you know. Yeah, the last project he tried to we tried to work with was this SCD project and I don't remember what happened, but it didn't, it didn't fit or the timing was off or something. Um and circle Island seems very interesting. So the ringön on circle Island, yeah. That sounds very, I mean that one is probably out of his, I mean that one I think I've told students to go after and they may have even met with them but ended up not doing their thesis. So I dunno what has happened there, but something didn't fit with the research question or something like that. But yeah. I mean he does have, they do have inspiration there, but it would be interesting to see um. New, previous and ongoing, but also maybe, and starting up unless there are only those, you know, and then if that's the case then I kind of want to know which ones are ongoing. Yeah. So just to be able to make it so that I can be more in the know for first to know and can approach timing that works for me. Cause then I don't cause the emails where they ask or I sometimes, I've also talked to Ola years ago now and we vetted and we put some projects together, but we didn't get it together in time so the timing is always is the most tough part for me. But, and then also I think also they could, they could like maybe they could have like thesis student area and have like your thesis and you, maybe they don't, I wonder if they have that.

E. Appendix: Interview transcripts

So, you know, cause there's different levels of students working with them. Yeah.

Interviewer: Like also from those different areas and disciplines.

U_2: Yeah. So there I think it could be very interesting. And the other thing that I think is a positive thing about FTK that I've never gotten to work with my students is this idea that there could be across disciplines set up like that one of my students and you could be writing this thesis together. Even if you're writing two separate theses you could be doing the research together. And I find that very interesting. I mean of course it's problematic for the academic sense, but if you still wrote two different papers, but maybe one part is like you clearly say we wrote this part together. I think that that would be quite interesting. And I think first to know has the ability to do that because they are crossing. Crossing some borders. You know, they could have a Chalmers student and HDK student and a so maybe some kind of like join this project idea or yeah. And have a deadline or do something like the other thing that I think that they could do that would maybe make it easier is if they did like, like humblebee does this, this project that's called the hive and it's where they. But but anyway you could do that could be interesting too to do some kind of like call for entry into projects so then it could be that I say, okay, for this course, you know, for the second year here is one opportunity to apply for because it doesn't necessarily have to be a sure thing for my students to be excited about it. You know what I mean? Like, yeah. So, and then it could be that they're setting up a team in a way, which is kind of what I think they wanted to do for the, for the space. And then I know pear has worked with this summer program situation with seed, so maybe some of that kind of could be interesting for them to do. I don't know.

Interviewer: Yeah. Like, because said like this year they opened a three 60 space and [inaudible] where like the master thesis students and startups work together. So we get like kind of an idea of what the others are writing about. There's no like we don't write together, but it's like an exchange maybe like, okay,

U_2: Yeah, but that's a good start. That's a super good start. So then maybe the next step for next year is to, or you know, is to have like a call for, because that's how my husband got his thesis at Volvo group is he answered a ad so, and I've, you know, they've mostly gone through the opposite, you know, no CV or vetting that I, but like more like helping me help my students. But in some ways my students, the other thing about it that I can tell you really is because it's like I'm a mother, so if I suggest something, they go against it. Some of them, I'm not taking that project, you know, like, so I also sometimes I like with first to know probably the fact that I put it in the list could be a discouragement. Okay. Yeah. I mean, you know, like this like nagging wife or you know, like by the time that they're in their second year, they're like, I'm going to do it on my own and I'm smarter than my teacher. Right. And I want them to feel that way. But also so, I mean, some of them take it, take it on, but they, what, right now what I've seen is that they've, they've gone and talked and thought about it and then found something they liked better or they've gone and talked as a plan B, like as like

E. Appendix: Interview transcripts

the safe thing. So maybe they could first to know, could get some excitement going and get some, like if they do an ad for one thesis a year, yeah. There could be building this building up the situation where people come to them.

Interviewer: Hmm. Yeah. Good point. Because I also, like in my program, I got the feeling it was also like kind of like plan B. It's nothing works out. We can go to first to know.

U_2: Yeah. And I mean, and that's nice. It's a very nice safety net. But but that's not what per and Ola want to be. Or maybe they do. And if they do and if they do then then let's lean into that. Maybe they aren't plan B and then let's make it clear like, but you can always be hugged over there by hugged. That's little, that's a little hashtag me too. But, but you know, you always can go and these guys will be supportive of you. So, so I mean that is maybe a brand question, a brand identity question actually in a way or maybe they need to have a couple of levels, you know. No, but I think also having, uthesis students as their main, like kind of being more outright with that too. Yeah. Possibly. Or at least that's who I, that's, that's how I will fill. That's how I'm capable of collaborating with them in more in more general. Okay. But then that's also not in my hands. No. You know, you have to choose it and this plan B thing and so, you know, and then it's kind of, it's a bit, you know, tricky between, between, you know, if my students don't take one of their cases. Is that like that like do Per and Ola think that I have convinced them not to or, you know, I do wonder if that's like ruining the relationship. Like is there a time where they will no longer come to me or you know, like, because I can't commit, but it's actually not me who should convince it's them who should convince the students. Yeah. So, yeah.

U_2: Good, good. I think the student perspective is an important one to be honest. So that's a good one. I think because in particular I think it would be, I think it's interesting to like kind of think about the power dynamics of all the relationships in this cake. You know, like the teachers doing the grading and the, and FTK having clients, you know, like the, yeah, the brokerage part, you know, so I'm glad that you're doing students. I think that perspective is very much needed, and I hope that they are very truthful.

E. Appendix: Interview transcripts

Interview U_3

U_3: Hi. It's U_3 giving you a call.

Interviewer: Hi. Yeah, thank you for taking the time for the interview.

U_3: Of course. Yeah.

U_3: I, uh, I read, read your initial email, um, just to give an idea again of the request, but you know, you can let me know what you need. I think my only request is if you're going to print something, particularly anything about the unit that I work in, I probably need to get a look at it, you know, approved or rejected. But just to make sure that if we have any folks in marketing that see anything, you know, for accuracy purposes, we get that input.

Interviewer: Yeah, definitely. So, yeah, I will, um, send it to you. So I have a ride back until beginning of June, I guess. And then I probably will send it to you doing may. Yeah. Yeah. Okay. And I do mind if I record this call, like to transcription later. Okay. Okay, great. Yeah. Um, so should we start with the questions? I prepared like some questions. Okay. So at the industry sponsored research is a part, um, of UCI applied innovation. So my first question is what was the inspiration and motivation to create the UCI applied innovation?

U_3: So we're now called UCI Beall applied innovation, um, and had our grand opening and the new space that the unit is now five years old. Um, but this was, I guess an initiative of the chancellor, uh, Howard Gillman. Um, he ended up bringing in, uh, Richard Sudak, uh, you know, after an interview process, um, tenants, but the candidate, so he is basically the person who, you know, build it from the ground up. In fact I was, so I was working in sponsored projects at the time and Richard had it big a cubicle with one other person who was kind of an assistant and was starting to, you know, figure out space and, uh, facilities and the kinds of things you would need to terms of size and the type of facility. Um, but I think the overall goal was to have a center for entrepreneurship and innovation. Um, and you know, not just to work with, and stimulate the orange County economy, but you know, California and beyond, um, so, you know, I don't know how much you know about university [inaudible] university, particular research administration, but, um, depending on the type of university, at least in the states, whether it's private or public, uh, back in make a fair amount of difference in the kinds of business decisions that the university is able to make. So, you know, one of the challenges, going beyond answering your question, but one of the challenges in dealing with industry at a public university is that there's sort of two different cultures that are coming together. Um, so university of California is a public university, which means we get taxpayer dollars. And, um, that means there are certain considerations we have when we are working with industry, things that we can and cannot do. So I think, you know, overall the goal was to create this, you know, this kind of, um, ecosystem of entrepreneurs and innovators and students, you know, develop these relationships with, um, you know, first and foremost, orange County

E. Appendix: Interview transcripts

businesses, but also California businesses, um, it's kind of be part of the stimulating economy.

Interviewer: Yeah. So like the, I read about the UCI research park. Are these companies also like sponsoring UCI in some way or is it more like just being co located?

U_3: Um, are you talking about like OC tech portal, that kind of thing?

Interviewer: Um, so online I saw the UCI research park.

U_3: Yeah. So research park. We've had the research park if you will for some time. Um, so there had been spaces, uh,

U_3: you know, where, where there are spaces for people. I'm not sure how long we've had space for companies that incubate.

Interviewer: Oh, okay.

U_3: But let's just say that research park is a term that's been used for a while. A good way to put it is that now we truly have a research park. I would assume you have you seen our building or our space, right?

Interviewer: No, it wasn't possible.

U_3: Yeah. So under, it's unfortunate that we're in this situation now, otherwise we can give you a tour. That really helps. Um, but yeah, research park typically is referred to an area on campus where there are spaces that people can lease and you know, that may be out, you know, companies, um, there may be university offices within that areas, um, that, that's how the term is typically used.

Interviewer: Like in your opinion, why is it important for universities and industry to work together?

U_3: Well, it's really what they have to offer. I mean, there are several reasons. So one would be, you know, if you have an economic downturn or you know, anything that could essentially affect federal dollars. So we get a lot of money from the federal government. Um, at the Irvine campus in particular, we do a lot of NIH and NSF funded projects. um, but you can't rely on that. So if you kind of want to grow the enterprise, you have to not only bring in the federal money, but you also have to look to the nonprofit sector and also the for profit sector. So with the, for profit sector, with industry the reason is, in addition to what I just mentioned is that at the university we do research and we do basic research. You know, there's translational research as research in different areas. So medical, medical devices, uh, we conduct clinical trials since we have a medical center. Mmm. But when you look at intellectual property. If we were to develop something at the university in a project funded by industry, um, one of

E. Appendix: Interview transcripts

the ways that we get that innovation out to the, to the public is ultimately by commercializing. And the university doesn't have means to commercialize a product necessarily. So what we could do though is we could take our intellectual property and we can license it to a company. And so by having a license agreement between the universities and the company, that's a way, but then allows the company through a license to use, uh, to further develop and then commercialize.

Interviewer: [inaudible]. Yeah. Okay. Yeah. And your role as an industry contract officer, so what do you do? So you like what are your usual responsibilities?

U_3: Sure. So in a nutshell, what I do is if a researcher wants to do research and they have a proposal or an idea, it doesn't always happen in this order, by the way. Here's how it should happen. They have an idea and there may be talking to somebody at the company and the company says that's a really interesting scope of work. We'd like to fund that. Um, then we have a proposal that goes to the company. The proposal would be like our scope of work, our budget, um, you know, whatever other information the company needs. And we would, so I review proposals and then I endorse them usually through a cover letter. And then the company would have an opportunity to review that proposal and decide if they want to fund the research. And if they do, then there's a contract and I negotiate the contract. So the main role, uh, to really kind of distill it and do I have signature authority for the regions of the university of California. So when I sign a contract, I'm able to bind the regions to a contract. So of course, the really important part of our job is that when we're working with a company, negotiating a contract and when we negotiate terms and conditions that we can fulfill. Um, because as I mentioned, you know, earlier, you know, first answer is that as a public university, there are things that we can do and there are things that we can't do because they would violate UC policy, then there are also cases, decisions that we can make. So, um, that's my main role, I would say as a, as a negotiator on contract negotiation.

Interviewer: [inaudible]. Okay. Yeah. And so, uh, does it also happen that it is the other way round that companies approach you and say, okay, we want to collaborate with UCI?

U_3: Right. So it can happen in all sorts of ways. So fortunately now with UCI Beall applied innovation and our website. But you know, yes, sometimes companies will access our, I think we have a listing of available technologies so they might find something that they're interested in licensing. Now the license agreement is a separate type of agreement. We have a licensing officers who have signature authority for those. But yes, sometimes we get companies that a researcher, a PI, ask them about whether or not they'd be interested in doing research.

Interviewer: [inaudible] yeah. Uh, do you know like what the reasons for the companies are like to work together with UCI? Like what the motivation is?

E. Appendix: Interview transcripts

- U_3: The motivation of the company?
- Interviewer: Yes.
- U_3: Well this is, so I'm in a fortunate position so I'm not a PhD. Um, but I've worked at this university for a long time. And one of the things that you start to realize that, um, and this part is opinion by the way, but in an area where so much basic research is conducted and you know, researchers are just wanting to try new ideas. And sometimes things happen by, um, serendipity, you know, and you don't know if you're going to go in a certain direction, but you do and you discover something. So a good way to put it is the universities are aware of what the Nobel piece prize winners are. So that would be the motivation. So I, I would argue that when you're intellectually curious, and these are centers of intellectual activity and curiosity, then you have all the kind of award winning researchers and people who are doing really cutting edge research. And I think that's one of the reasons why companies would come to us is because we have the experts.
- Interviewer: No true. [inaudible] yeah. Uh, like is it difficult to approach companies and as a researcher to find a company that wants to support the research?
- U_3: Yeah, I mean, it's interesting because without sort of downplaying our role, my job is fairly transactional. You know, I, I take an agreement, either provide a template agreement that we have that has terms and conditions we can agree to. Or I look at a template that a company sends and I negotiate terms and conditions. But in terms of bringing the two parties together, I would say that it's hard, to sort of force that relationship. I think we can help make it easier to do. But I would say that I don't know that we have researchers on our campus come to us and say, Hey, who would be good to look at for this scope of work I wanted to get funding for.
- Interviewer: Oh, okay. So they already have usually a partner. And you set the agreement up?
- U_3: Yeah, I mean I would say our role facilitates that, but you know, I mean, you know, you're a grad student so you're going to be a PhD holder at some point in your life. And if you go into academia, as you know, you're bound to publish or perish, you're going to have to publish. And in order to, you know, research, do research and publish and you know, kind of build your, your CV, um, you're going to be necessarily looking at, you know, all of the different, you know, government agencies that might fund you. And you know, that's just what you'll do. It's almost like a literature review. You know, where you're going to be looking at everything. I mean, I will say this. One common occurrence is that, um, researchers who have former grad students that go in the industry, uh, that happens a lot. So a former grad student gets a job at a company and the company's interested in doing something and they say, Hey, my old mentor at UCI, you know, knows somebody who's really good at this, why don't we contact them and see if they'll do a scope, you know, perform a scope of work

E. Appendix: Interview transcripts

for us. Um, and I think one of the reasons that that's such a common occurrence also is that if you think of the number of people graduating [inaudible], you know, just increasing every year, right. You can't possibly find enough universities to accommodate all of those people as PhDs because of course the people that have them who have tenure and are full professors have, you know, 30, 35, 40 year careers. So it's not like every year people are vacating in there, all these new assistant professor slots that are opening up. So, so many people are finding their own niche, you know, in the world as people with PhDs, but you know, you are getting a lot of folks who go to industry and that there's your connection.

Interviewer: Yeah. Then you kind of get like, connect yeah. Contacts with that. True. Mmm. Yeah. Um, also like, because you see like the different companies, uh, working together with researchers, do you think that the company size and organizational structure is related, like to, uh, if they want to work together with researchers as a company?

U_3: Uh, sorry, I'm not sure I'm understanding the question.

Interviewer: Yeah. So, uh, I'm interested in if company size or organizational structure, um, is like a factor for companies, uh, like if for example, like large international companies rather work together with, uh, universities or if it's more like the smaller companies.

U_3: Yeah, sure. So, as I mentioned earlier, there's definitely kind of a, especially with a public university, like university of California, there's a bit of a, a meeting of the two cultures. So for example, uh, the university culture is very open. Our goal is to disseminate information, sharing information, publish, um, you know, our, we are all about protecting academic freedom. Um, the company culture is more about, it's more closed typically. So, uh, there's a lot of proprietary information that they need to keep confidential. Sometimes a company, particularly a smaller company might have one product. And so for example, one drug that they're trying to get to market and you know, that's, that's their, their thing. And so if anything were to be, um, you know, there were any sort of breach of confidential information about that one proprietary product that could essentially ruin their company. So it depends on the company. But I would say, you know, universities tend to be more open, uh, and about kind of free dissemination of ideas and the companies tend to be a little bit more kind of closed and proprietary. Um, and so the challenge is when you have those two positions meeting in a contract, as you can imagine, it'd be quite difficult to negotiate. Yeah. So that, that could be a challenge. Uh, sometimes what happens, so we have a number of officers in our unit and our workload is divided up by departments. So for my particular departmental complement, I actually ended up working with a fair number of companies that are smaller. Many of them are startups, many of them do not, do not have any legal representation. So in my case, I'm actually sort of lucky because a lot of those companies are willing to kind of accept our templates and they're pretty, you know, not reasonable, but they're pretty easy going about contract languages

E. Appendix: Interview transcripts

and a lot of negotiation because they just simply don't have the means to, to challenge it. Um, and we're not in a position as a public university to try to get a good deal in an underhanded way. Basically we are trying to just ensure that we follow university guidelines, not the negotiation in the sense that we're trying to get the best deal possible. It's, it's more that we need to make sure that we're paid for our time and our efforts, the cost of our research. We need to make sure that we maintain those, the ability to publish, uh, that we don't give away our intellectual property. Things like that. But yes, I would say, you know, generally speaking, you know, the view from industry I would say lots of times is that in particular public universities that it can be challenging to work with them. And I, I think that's one of the benefits cause UCI Beall applied innovation. But I think we in a big way make very large steps towards getting rid of that notion. You know, that we can work in the speed of business and we can be flexible and nimble.

Interviewer: Uh, so like, do you feel like a difference since you established the UCI beapplied innovation because you probably had like industry relationships before?

U_3: Yeah, I mean I would, well, in fairness to my former colleagues, I mean, you know, one of the challenges in research administration, the workload can be pretty high. Again, you know, if you are working at desk, a research administrator, one of the things you process is, you know, grants that come in from national institutes of health, that's a very different kind of workflow than working a desk where you're negotiating clinical trials. Some of the agreements can be very kind of high pressure. It's difficult to turn them around quickly, but that's the expectation. So timing is really important. So, um, what I would say is one of the benefits with applied innovation is that, um, they initially hired enough people to be able to handle the workload in a way that we were able to work more at the speed of business. And that is hugely helpful because if you, if you don't do that, you're spending most of your time reacting and just trying to handle the contracts where you're getting complaints. That's not a good work mode to be in if you're trying to manage everything and keep people happy.

Interviewer: Yeah, I can imagine. Yeah. Okay. Um, so you mostly work together with researchers or do you also work together with uh, students or grad students?

U_3: Yeah, I would say primarily I work with, with PIs, with PhD, you know, researchers, faculty members. But I do work some with grad students because you know, as you know, many of them say to their grad students, here you go do it and they make you guys handle it. Uh, so yeah, I work with grad students a bit. I would say I don't work too much if at all, was undergrad. And then the really big group, I work with our departments' financial analysts because the financial analysts who work in the PIs home department are the ones that do things like build a budget or collect the information from the PI when they're writing a scope of work. You know, they kind of put together the proposal. So yeah, I work a lot with other administrators on campus

E. Appendix: Interview transcripts

- Interviewer: [inaudible] but do you also have like students that approach you with projects that they found a company that want to use their ideas?
- U_3: Yes, we get some of that. But I mean, I would say typically those kinds of requests, even though the student might be the grad student on the project and most of the time those come to me from, you know, their, their mentor, you know, the, or the, you know, the researcher whose lab they work in. Well I've had it. I mean I'd say, you know, contact like from you and you know, people that are kind of asking questions or maybe have a project they're interested in. Just a little more sporadic. I mean, I don't know that I've had a lot of that.
- Interviewer: Okay. Yeah, because second, my thesis, I also want to look at like the innovative thinking of students. So I was curious if it like happens a lot that the students have ideas and they want to like work together with a company to develop the idea.
- U_3: Yeah. Let me clarify too. I'm, I'm talking specifically about my desk and my job as a contract officer. I mean, I, I what I should say is that UCI Beall Applied innovation is full of that activists because basically we have programs, events. You know, we kind of catered to [inaudible], you know, the, the young entrepreneur. So it, you know, if there's a grad student who has some idea and they're interested in pursuing it, you know, he probably couldn't find a better place than, than applied innovation. That doesn't, you know, that doesn't my involvement, again, like I said earlier, it's fairly transactional. So I'm, I'm getting involved at the point of which there's natural proposal to go to a company. Yeah. So it's not that I wouldn't be able to direct a student if they came directly to me, but we're not, we don't really do business development. Um, you know, there are other folks that handle that.
- Interviewer: Yeah. I had a look at the student startup fund, so probably they would go there if they had an idea.
- U_3: yeah. Or, you know, again, we have people to come to applied innovation who end up working, you know, or being part of various programs where they can develop their ideas. You know, to give you an idea, I think the new building has this as well, but we had basically the equivalent of a shark tank, you know, where people could go and do kind of practice pitches and then we would actually have, you know, regular meetings where they would actually pitch to real investors. Yeah. One of, one of the benefits with the way applied innovation is set up is that we have lots of space for people who are tenants of ours. So the tenants are small businesses, uh, venture capital groups. Um, we have a small business development center there. Um, so with so many different organizations, uh, leasing from us, it kind of puts, they put everybody together in the same building.
- Interviewer: Is that the Cove? Because I had to look at the Cove

E. Appendix: Interview transcripts

- U_3: that that is, yeah, the Cove is essentially what we are, how we refer to the space and kind of a rep who I've referenced to this idea that it's an ecosystem for innovators. Entrepreneurs. Yeah.
- Interviewer: Okay. Yeah. So yeah, because you also have like startups I think involved in this space, I think. And you also have like a startups that are located on campus at the Cove, I think,
- U_3: right Yeah. The space we have is we have , we have dry lab space. On the third floor of our building, we have wet lab space, um, which is under university lab partners. Um, which is a, another group that's funded by the Beall family. Um, we have, uh, and then as I said on the floor where I am, um, we have our administrative staff, I'm kind of one half and then there's a common space and then there's a whole other half or, uh, tenants that lease. And yes, many if not most of those, um, people leasing are startups.
- Interviewer: Okay. So it's also common like for the people that, like if a startup is there at the Cove and then they work together with, uh, students that are at the Cove and then they approach you?
- U_3: Yeah, they may or may not. I mean, I think with the start ups who are leasing generally they're in that space. I mean, there are different things that you can actually lease or rent. For example, if he just wanted a bench and bench space in the lab, you could rent that only. Um, yeah. So there, there are different sort of level, degrees to which you can [inaudible] lease space at the cove.
- Interviewer: [inaudible] okay. So it depends on what you want to achieve and what you want to do.
- U_3: Yeah. Right.
- Interviewer: Okay. Um, yeah, I'm not sure like if you can answer that, but, uh, because I wanted to have a look like, uh, how the UCI applied innovation programs help students like to develop this innovative thinking? So, uh, if the programs helped them to become more innovative.
- U_3: yeah. Let me, uh, quickly go to our website here. yeah. So, or for own, uh, students, we have the antreprenuer center, which is the center for young entrepreneurs. Um, the other thing, there's a student startup fund. There's iCore at UCI. um, those are all under the programs link. If you go to the UCI Beall applied innovation site, right. Um, and iCore essentially the idea is taking your idea from the labs, the marketplace. So it's NSF money. Mmm. Designed to, you know, help financially support that, that process and be here, you know, typically the 13th. thez apply. I'm trying to look here for eligibility. Yeah. So in this case, UCI grad students, postdocs, scholars, faculty and recent alumni are encouraged to apply. Um, so you know, some of these things that I've mentioned to you are, you know, are UCI specific, but that is something that we

E. Appendix: Interview transcripts

support. So it's basically exactly what you're talking about. I've got an idea, how do I move that from the lab to the marketplace?

Interviewer: [inaudible] so that's like a step before they come to you?

U_3: Well yeah, I mean they could participate in these programs and I might never see them. You know, it really just depends. And you know, keep in mind too there, there are various types of agreements. So as I said before, you know, the company wanted to license intellectual property from UCI. That's a license agreement, which I am not involved in and if they want to sponsor research where we conduct a scope of work that that would be something I would be reviewing and negotiating

Interviewer: So they don't want to use it but they want to like support the university in some areas?

U_3: yeah, they might be, you know, typically our deliverables when we performed a research scope would be our final analysis. So they typically get a technical report of our results and that that's essentially what they're paying.

Interviewer: Okay. Yeah. Okay. Thank you very much. That's like so far with my questions.

U_3: Okay.

Interviewer: Yeah, it was really interesting and I think I got a better understanding of how UCI operates.

U_3: Sure. Yeah. Yeah. You know, even at five years, I mean Beall is still pretty new. I've been there the entire time. But, um, but to be honest, one of the reasons I want to look over anything you might publish is because, you know, I don't even know that I can give you a full tour of the building and said all of the points that there are to offer and everything just, you know, 100% accurate because, you know, I'm, I'm somewhat siloed, you know, by sort of transactional nature of what I do. But of course PIB is that we're not siloed at all because we are all in one place and the information is there. So I think it's a question of using it enough and encountering it enough to become, you know, fully comfortable with it. So it certainly getting better [inaudible]. Yeah, if you need clarification or if I see anything that maybe could use more detail or corrections, you know, as far as being accurate, then I'll certainly let you know.

Interviewer: Yeah, that would be great. Yeah. Yeah. So I will get back to you as soon as I wrote like the analysis. Okay. Yeah. Okay. Then I hope like that you hold up with the current situation and stay healthy.

U_3: We will get better. The little kids do are not little anymore. They're both graduating high school this year, and I feel, yeah. That's so sad that you can't do

E. Appendix: Interview transcripts

it now. Like they canceled everything, like make it soon. Yeah. Yeah. Okay. Then for this day, and thank you for the interview. Okay. Take care. Bye.

E. Appendix: Interview transcripts

Interview U_4

U_4: good morning.

Interviewer: Good morning. Hi. Nice to meet you.

Interviewer: Thank you so much for taking this call. I understand that you have some questions regarding some of the programs that we offer here at UCI Applied innovation.

Interviewer: Exactly.

U_4: Okay, sure. So, um, we can go ahead and get started. Um, I'm gonna switch my screen a little bit here. Okay. Were you able to take a look and flyers that I sent you earlier this week?

Interviewer: Yes.

U_4: Okay. So, um, this all out... based on the information that you selected, the programs, um, that are more pertinent to our student populations and send it over to you so you can get started first on, um, the, well actually I'll start off with any questions that you may have.

Interviewer: Okay. Yes. So I'd like to start, um, I was curious like the inspiration for creating UCI applied innovation in general, like these several programs to support students to become more innovative. Yeah, exactly. Like I wanted to know more like where it started.

U_4: Okay. So, um, you, this, uh, B, our department is relatively new and we just hit our five years, um, anniversary Mark. So what came out of that was that, um, there was a need, um, this department is, uh, an initiative that was created by the chancellor to help or the entrepreneurship and innovation ecosystem within the UCI as well as, um, branching out and, um, communicating with the like entrepreneurship ecosystem within orange County. This is our central location. If you look on our website, there are different programs that, um, our program is like, well, our department is one of the first to combine the research translation group in addition to the sponsor industry research along with like all the entrepreneurship programmings that are available, uh, at UCI in one central place. So that it's make, whether it's a faculty or a student or staff who are interested in learning more about entrepreneurship or who wants to start their company, our department is here to help them to reach that next step. Yeah. So our, um, chair or our head or director is higher on and he reports directly to the chancellor to the PO. And, um, that's why like we're not tied to any school, like a lot of time university. Um, something like a center for entrepreneurship is usually tied with like the school business for example. But then because we are like a separate entity entity, we are able to support, um, all various schools on campus. We're not tied to any particular school.

E. Appendix: Interview transcripts

- Interviewer: Interesting. So like every like student can approach you even if it's like bioengineering or like business.
- U_4: Okay. Yeah.
- Interviewer: And you are responsible for the student's start up fund right?
- U_4: Yeah. So, um, within my group, um, I'm under the new venture group. So all role is to help support the startup ecosystem within UCI as well as making connections for them within like the ecosystem itself. So, um, within that role, I uh, help with the students' startup fund program. A program that provides micro grants with students who are just starting out on their entrepreneurship journey and they are interested in learning more about, um, they want to start a business. They don't necessarily have the money, the friends and family funding that early stage startup companies need to get their program or their company started. So this whole program is like a non [inaudible] funding source that, that we provide to students so that they are able to go out and do some customer discovery or like if they need help with like prototyping, they don't have money to purchase those things. We are able to provide them with like a little bit of money so that they can get their projects started.
- Interviewer: [inaudible] and like, uh, how did you come up with the idea for, the start up fund where the like a lot of students that had ideas and like told you okay. But we don't have to like means to start it?
- U_4: Well this program is actually funded by a, um, the Nicholas endowment funds. So they, we, we see that there's a need like, as you know, like UCI is like the top rated, um, number one school based on U S journal, um, world report for like underrepresented minority students. So the majority of our students who come to you, they don't have like the early stage funding necessary to get their startup started. So we said there's a need there. And then because we are trying to, you know, teach entrepreneurship and innovation among our students population, this is something that's necessary for us to have in order to support those students. so that is how the idea came out to be. It's relatively new. It's a little bit over two years old. Yeah. So if you take a look at the program stat sent you based on the latest number, we have over 140 students, uh, who receive funding. But we have a lot more students who actually apply because this money that we receive is based on like a year to year funding cycle. Um, we can't help support all the, you know, students that comes through. So it's really a space on like first come first serve basis or anybody who's interested, they can get anywhere from like a few hundred dollars to a thousand to get their ideas started.
- Interviewer: Yeah, it's really nice. Um, yeah, like I'm, I was curious because, uh, the students that you, give grants to? Um, yeah, yeah. Is there like a comparison of the success of startups founded by people that were involved in the applied innovation programs before and students that did start on their own? I was just curious if you can see the effect of the programs, like if it helps the students.

E. Appendix: Interview transcripts

U_4: So as part of like the process for them to receive money, we do track their progress in terms of like, Oh, you know, after they received the money, what did they do with the money and, um, how successful were they? Some of the things that we use to, um, highlight their successes that these students receive money for prototyping and they go out and they compete in like nationwide business plan competitions we do have a couple of teams in the last couple of years who won first place at UCI itself. We have, um, the business plan competition that's being hosted by the school business. So last year we have quite a few of students who receive like awards in their track. Um, let me pull up the stat for you. Let me see if I can find it. There wouldn't be one moment. So in the competition last year, um, there are five different tracks that um, student team can enter. Based on our funding. Like our, the awardee that receive money from our program. Three, um, three teams were able to place in the final like winning either winning first point prize or second place out of five tracks that was into competition. And then there's another business. Um, there's another competition that is within like the um, the school computer sciences and engineering. They have their own separate tracks. And two of our teams, or actually three of our teams were uh, one first or second place in those, um, competition as well under those two tracks that they have,

Interviewer: I see it really helps the students like to get this knowledge and the support to prepare.

U_4: Yeah. And although like the majority of our students who do receive the, because the students in this program are very, very early stage, um, it's a little bit harder for us to track later down the line like whether they are successful. Like they incorporate or you know, they um, go off like a successful startup. It's a little bit early for us to gauge that right now. But we do have another program that, um, it's one of the flyer that, I sent you some of our students who receive money from the students start up fund then go into an incubator here at [inaudible] innovations and then they from there they, you know, like continue to work on their projects and then do other things.

Interviewer: Okay. Yeah. So do you have like any statistics? Yeah. You said it's hard to track the success, but do you know if the startups survive like the student time? Like if students graduate, do they continue to like work with their startups?

U_4: Um, we don't, a lot of our students who do this, they do it, um, in their senior year. And some of them who are like very serious about it, they do go off and continue their projects. And those are the teams I would go and enter into our Wayfinder program. But then a lot of the other teams kind of like fizzle out.

Interviewer: Ah, okay. Yeah.

U_4: So because they're so early stage it's good that we are supporting them but then the majority of them, like they don't become anything but they spin off and they just like the experience of like going through the process is very educational for them.

E. Appendix: Interview transcripts

Interviewer: Yeah. Also like the students because uh, the UCI applied innovation programs do the students get credit for it if they participate or how does it work because it's not like a student program?

U_4: No, this is something that's like co-curricular is just adding onto their educational experiences here, when they're at UCI. There are talks, um, here that um, they are able to receive credit. It's something that we have been trying to do for quite a while now just because like we have, there's so many things that needs to be done that we don't really have the bandwidth to touch on that. But just to share with you recently, last week we had a a system wide innovation and entrepreneurship, um, meeting with all the different UC here in California and our other UCS at, um, like for example, UC San Diego, they do offer credit for students who are participating in some of the like entrepreneurship um, education that they offer at their program. So this is something that we are trying to achieve maybe within the next year or so. We're hoping to get that started from them so that we can engage more students because the majority of our students, you know, they're so focused on their schoolwork, they don't have a lot of time to work on something like this. This takes a lot of time so we can give them a little bit of incentive, like meaning they can get credit for the work that they do outside of like the school curriculum. This might, you know, are amped up their motivations and interests in getting started in getting involved in entrepreneurship in general.

Interviewer: Yeah. That's nice. Um, also because I saw you have the UCI research park next to campus. Do you work a lot together with the companies there?

U_4: Um, so a lot of the company here, it's, so our location is in um, university park and we do have like a lease with the Irvine company so they together with them we kind of try to be strategic in terms of like what other companies can be around here. We want to be in that ecosystem that nurtures like entrepreneurship and the startup world. So I wouldn't say we do have some kind of connections with some of the companies that are here. But then there is also like another accelerator or an incubator like within the UC, um, research park and we do some collaborations with them. For example, some of our, uh, teams are in the Wayfinder program. Um, this program is like a six month cycle. So teams, they apply and they enter for six months and then they get evaluated on their status or their progress. Based on their topics it's either we recommend them to stay within our program or like we can, if they're ready then we can um, refer them out to other incubators within our ecosystem. Like the neighboring, you know, incubator here or close to us. So we do have some teams that go out and spin off and enter another incubator after they are here. So in that way we do some collaborations with them and we also invite them over to some of our free events. So like speaker series, they do come over and we have a lot of their teams who come over to utilize our resources, like attend our presentations on various entrepreneurship topics. Yeah.

E. Appendix: Interview transcripts

- Interviewer: Yeah. Because my thesis, like my work is about like the university industry collaboration and like how it helps students if they get like input from companies.
- U_4: Yes. I know a program that we have here is, um, I don't know if you saw it on our website it's the innovation advisor program. So this is like a free program for anybody, like in the business where, who was interested in being a mentor to our startup teams? The registration process that they go through is a great service I give, they choose to enroll. Like this is something that um, we ask them like, Oh, you know, are you interested in, you know, the general guidance for our teams? Or like what is your motivation for joining? A lot of them are joining our programs so that they just feel like they want to keep, give back to the community. So our innovation advisor, they do have like, um, meetings with our students and give them guidance. So in a way, like for example, if there's a student who is doing like a medical device company and then they have some questions regarding like the FDA approval process. We do, within our network of innovation advisor, we have over 500 innovation advisors in our database. So based on the criteria of what the students need, we then make a connection with them to talk to somebody who's doing like medical in the medical devices industry to help them, guide them through the process. And there are like guidance to answer your question there in that way, there is some connections of how we tried to connect industry to students for entrepreneurship journey. Yeah.
- Interviewer: Yeah. Like do you know like the students that get your funding, do you know where they get their inspiration and ideas?
- U_4: Um, a lot of our students, um, there is a, another program that's called the bio engine. It's like a senior design project that they, the bioengineering students within the school of engineering go through. So we have like projects that spin out from that. I think it's like a list of, they work with the faculty over there to come up with ideas to um, to work on their projects. So, and it alerts student who are working on something that's not like med devices or, so it's just based on their like talking to their friends and looking what's out there. Like, it's just their own interests that get them started.
- Interviewer: Oh, okay. So there is no like, I don't know, program with a company that students go there and observe how they do things and then maybe like develop ideas but could be like done in addition or like what could be done in a new way.
- U_4: Um, I think in the, um, the bio engine program, there is something that they do with like industry. Um, but then, I don't know, I'm not like really sure like what entails like the, everything that goes in that. But then I know that they do meet with some industry companies to get like the networking started, but I'm not sure like give them opportunities for to spark the ideas. That part I'm not sure.

E. Appendix: Interview transcripts

- Interviewer: yeah. And like, do you feel like, because you've worked a lot with the students that it's got started, do you think it helps them if they have like a company that gives them like real world insights to guide them?
- U_4: Yeah. Yeah. I think so. Like a lot of our students who go through the program at the end, you know, like they all come, they all have like positive things to say. I actually 100% of them say that the program really helped them out, you know, just that they, so that they don't have to worry about that issue of like having money to go through the process, the educational experience of having to go through this is very valuable. It's invaluable. They learn so much from it. And although it's like some of them, the majority of them don't go out and continue their work, but then that gives them the experience they need to go into that industry that they're working towards. Yeah.
- Interviewer: [inaudible] um, yeah. So in your opinion it's like beneficial if universities really try like to like support students to get like this innovative mindset and maybe like work with companies to get the real world experience?
- U_4: Yeah, I think so because entrepreneurship is not just about, it helps you, you know, become like a business person per se. But then it also helped them with other things, like they, students nowadays, they don't a lot of time have that experience to go through like the soft skill learning process. So, um, in addition to learning how to like, how a business runs, they also learn how to communicate and like how to like simple things like, Oh, you know, how to talk to other people, help themselves out there. So in that regards, it's not only valuable for their, you know, just experiences and learning about entrepreneurship, it's also helping them with everything else. So it is a valuable program and I feel like all schools should do. And in fact we do have a, um, an internal, uh, innovation and entrepreneurship, um, collaborator, collaborator network within the various school, like we have representative from our department or in others. And then also deans from other schools. Like all of them have been like really been involved in like trying to get their students involved in entrepreneurship and innovation so that they are exposed to this and they learn from it. So I think UCI is at the forefront to try to get their students, um, you know, like be more innovative and have that entrepreneurial mindset. Yeah.
- Interviewer: Um, yeah. And like the, the funding for your programs, do you also get support from companies or is it comes as from a tuition?
- U_4: No, right now it's, the funding for the students startup fund is from like an endowment, like as uh, a private donor. So the processes that we reapply every year for them, it's not like a lot of money, but it is like significant enough to make an impact on our students. So it's not something that we're doing. What we're looking into, getting more sponsorship from companies down the line. But for now as far as this year goes, it's from a private donor.
- Interviewer: okay. Is it difficult like to get companies to fund the program?

E. Appendix: Interview transcripts

- U_4: can you say that question again?
- Interviewer: Is it difficult to like get companies to support your programs?
- U_4: um, we have a development officer in house to help us, you know, raise awareness on what we're doing here. But because we have like so many programs and so many different initiatives, like we, she, she doesn't have enough bandwidth to like do more fundraising. But it is one of the things that we're trying to, uh, get more of. Like for, uh, we are trying to see if, um, other school who have students are in row in our program who are utilizing how resources to see if they're willing to, you know, like help fund some of the take down some of the costs for us. So talks are in the works right now with the different schools to see if they are able to help us next year. But until other programs or like I'm to answer your questions, like another program that we have is called the iCore program. It's um, it's an NIH, NSF, um, funding that they give to us to help run the program. And also they give us a small budget for anybody, any teams who participate in the program so that it can go out and do customer discovery. So that program is funded by the NSF.
- Interviewer: Mmm.
- Interviewer: [inaudible]
- Interviewer: okay. Yeah. Um, do you have like a way to track if the students that apply for the programs, if they are already innovative and that's why they apply or if they like develop this innovative mindset while they participate in the programs?
- U_4: I would say it's a mix of both. Some of them, um, they have their own idea and they just are interested and others are just, you know, like they are learning or what is innovation? What is entrepreneurship in the email that I sent you earlier, we have another center on campus that's geared towards like undergraduate students. So that center is for anybody who, for any students who are interested in learning more about innovation and entrepreneurship to go to and we have like programming at the center that help them, uh, develop that entrepreneur mindset. And some of the students develop like their idea while in the program and while others who already have interests, you know, like based on, um, I met with a student recently who was already being an entrepreneur like when he was in high school. And I don't think guys, you know, it's like, that's like it, like it's, it's inside him. Like he just wants to continue to work towards it. So you continue to develop that while he's here. So that's good that we have such a center so that student is like, who are engaged, who are really interested, have like an outlet that they can go to. We participate. So it's a mix of both.
- Interviewer: Okay. And that what you said, it's the ANTrepreneurs center?
- U_4: Yeah.

E. Appendix: Interview transcripts

Interviewer: Okay, great. Yeah. Yeah. I had to look at that. Yeah. Like at the entrepreneur center, do you know like how it usually works? Do the students come there with the idea or like get support to develop an idea?

U_4: It's both. So, uh, we do offer like consultations for students who have like a business idea and then they don't really understand the market and they just need more fine tuning. They, that's where they go to get their ideas started. They receive guidance from my colleague who was also part of the new venture group, who develop like a business plan, work out that financial, what is their business model? All of those things they get to work on while they're at the center.

Interviewer: So it's like the new venture group? So it's from the industry. So you have like representatives from the industry that help the students to or what is the new venture group?

U_4: New venture group is what we call our group internally at BYO applied innovations that works towards to help like the startup community. At the ANTrepreneur center is like a, a subset of that group that helps specifically to students. And then for my role here in new venture group is I help build a pro curricular experiences that relate to entrepreneurship and innovations to the student populations.

Interviewer: Okay, okay. Uh, okay. And I also had to look at the Cove. So I was curious because uh, like it seems like some programs are like combined at the Cove. So I was wondering the Cove if it's like a place where like the different participants meet or like how it's set up.

U_4: The Cove is the physical space that we call that our, um, department is located in.

Interviewer: Okay. Yeah. So there's like where the students go and then they can participate in different programs or how does that work?

U_4: Exactly.

Interviewer: Okay.

U_4: Yeah. The cove is the physical space, like our physical address. [inaudible] It's like the over branching department and the various programs is hosted by the department at the Cove location.

Interviewer: Yeah. Okay. And I also read that at the cove you have like a small office where you have like company representatives coming in.

U_4: Yeah. So um, because we're trying to build that ecosystem, we try to, uh, we have um, like startups themselves who are, you know, like oftentimes startup

E. Appendix: Interview transcripts

company that are just working in their garages. So we provide like a physical space for them and all the resources necessary. Like things that you don't normally think of when you are trying to run a company like, Oh, you know, it's just like internet, wifi and a printer. So we've provided physical locations and to gather all the innovative thinkers in the startup world. We have a venture firms representative, you know, like we tried to build those connections for companies to be in the same location so that they can have those interactions. So that I, that's the whole purpose of having like offices for smaller companies or like start up companies within that space. They do pay a small like rental fee to be here, but just so that they can have access to like the whole, we have a lot of like events here that are important to their learning or their experiences to help them build that network to get the next stage. So that's the whole idea.

Interviewer: Like is it popular for companies and like startups to get access to the Cove?

U_4: Yeah. And that's so um, all of those, last year we were in like a smaller location. We moved to this location it is a three story building late November. And um, because we were expanding so much, you know, like we, we move from one building to adding to another building and now we have a three story building. Within our space we have like, um, staff as well as start a space for our startup companies. Well, it's like an event space on the first floor to help, you know, the other people within the industry to come and just to mingle. And to network, to build an environment where people can network and learn from each other as well as the startup. Uh, within our space we also have like a maker space, so that they can like students who are working on like a medical device, they can come in, there's a space for them to work on their prototyping like that.

Interviewer: Nice. And do you know anything about like the motivation for companies to like get access to the Cove?

U_4: yeah. Yeah. So again, like just being here at the Cove, help them make those connections. It's just easier. Like they feel like they're a lot of time, it's also motivation and like, um, they like they, they don't feel like they're a real company unless, you know, they're in like a physical office space. So we have like different pitching events and stuff here too. So a lot of it, I feel like it's an opportunity to network and make those connections to get them to like various, you know, ideas and get themselves out there. That's why, that's why it's important for them to be here.

Interviewer: And so that, because I read about the Cove fellows, so is that the name for the students that are participating in a applied innovation program?

U_4: Um, so the fellows that's a different, we have like different, um, I guess like three different kind of fellowships now. I think what you're referring to are the RTG fellows. So these fellows are actually graduate students interested in like other options because a lot of graduate students they go to school thinking that they are, um, they're going to be in academia. And oftentimes there are all the things that, you know, like in the business world that you might be interested in.

E. Appendix: Interview transcripts

So when they're here with us, they help us with like the research translation group. We do things like, um, they help like the licensing officer do like patent searches or looking up on like different things to help at technology that's the RTG fellows. And we also have like another program for the enterprise collaboration group. So for this fellowship, I believe they're trying to make connections for UCI, um, for the various school on UCI with industries. So they're trying to build that relationship between like big, big corporate companies. And what are different ways that we can partner with, um, some of the departments here at UCI to bring the technologies that are, the faculty are working on, into like, um, the business world and try to get that technology started. Yeah, so those are some of the new, um, the fellowship programs that we have and we also have like interns that are helping us with, um, various things within the office. And these are like pay internship and the fellowship is also a pay fellowship. A lot of our interns are working in the lab, themaker space lab helping with like figuring out the machines and stuff like that for the various, um, student group that comes in to use it as well as, um, we have a big, um, marketing department within Beall Applied innovations and they help us with our marketing material. Like the flyers that you see, they help put them together as a website maintenance as well as like, um, we have magazines, articles that comes out and they help write those stories to get, you know, like bring awareness to Beall applied innovation just because like again, they are, we are so new. We need to make sure that like faculty on campus, students on campus aware that we exist, that we have services that are available that are useful to them.

- Interviewer: Yeah. So that's so far with my questions about the different programs.
- U_4: Okay. Yeah, we um, you probably saw on our website but um, you got to me or you can also reach out to my supervisor too. He's the director of new venture group. He can answer any additional questions that you may have as well.
- Interviewer: And what's his name? I'm not sure if I saw it in the email.
- U_4: His name is Matt Hansen. If you go to our website. I think his email is just Matthew.Hanson@uci.edu.
- Interviewer: Okay. And do you think it's possible to someone at like the entrepreneur center?
- U_4: Okay. So he's actually on paternity leave. Yeah. So let me see. He comes back within a week or so, so we can try to set something up so that you can talk to him. Cause he don't have a lot of students at the center that, um, go through his poems. So it's like a, a funnel really. Like the students go to the ant center, they get introductions on the various poem that we have here at open innovations. And some of the students that go through the programming at the an center then goes through the students startup fund program process. They have funding and then they help, um, the ant center manager help them find to like their budget and helping them, what exactly do they need right now to get their

E. Appendix: Interview transcripts

ideas off the ground. They apply, they get help. Um, they go through competitions on campus and then from there, like if they have very serious about what they're, um, what they're working on, they move into our Wayfinder incubator program. So certainly you can talk to him, but um, or let me, he doesn't return within a week or so. So I'll touch base with him. And maybe you guys can set up like another conference call or something too. Yeah.

Interviewer: At the Cove. Do you think it's also possible to like maybe talk to co-fellows

U_4: um, call fellows, so RTG fellows or which,

Interviewer: and they get the fellows that are connecting, uh, tried to connect your program with industry?

U_4: Um, that I'm not sure. Um, when you talk to, um, you can, you can try to see if you can send an email to Matt and African if that's something that we can explore because that's not the fellows are not within our groups. I'm not sure.

Interviewer: Um, is there anyone in your group involved like with, uh, another program that I could talk to

U_4: Um, so the ant center would be another good start to get an idea on how, um, students interested in entrepreneurship and innovations work. Like how do they go through the process as far as, um, other programmings besides the ones that I sent you. We have like additional programs for um, faculty, but, and I don't think that's what you are interested in.

Interviewer: no thing is, would be interesting to talk to people like involved in the programs stand of innovation programs, uh,

U_4: been talking with like the students.

Interviewer: Yeah, exactly. That would be nice to also get like a student perspective.

U_4: Um, I can see if I can make an introduction to one of our student who is in charge of like the, the student I mentioned earlier who was already interested in entrepreneurship or like in high school, please know that a students right now they're in like the midst of like finals. So I'm, I can certainly make the connection, but then, um, I don't know how responsive that'll be.

Interviewer: I bet that would be great.

U_4: Yeah, sure. Awesome. Yeah, go ahead and make that introduction for us. Not a problem. It would be great. Okay.

U_4: How long are you here? I'm in California until end of March. Okay. How are these going? I know I didn't recently, like right now like everything is exploding

E. Appendix: Interview transcripts

as far as Rono virus things is concerned. So is everything working out, like I know that you're going up to North Cal to meet with some of the company up there too. Is that working out for you?

Interviewer: So I went to San Francisco like the past two days, but then that because I wanted to meet with people, but then they asked me, okay, can we please do it? Like, yeah, a conference call because all people are doing home office. So yeah, it's not that easy, but it's like, yeah, I know, but I'm happy that I was still able to enter it because, uh, the travel ban from Europe started like a Saturday, so it was lucky I could make it.

U_4: Yeah. Yeah. Um, let me know if there's any other questions you may have in an outside really make that connections for us. And um, one, I'll send an email to my colleagues too and maybe once he, then he can, you guys can make that connection and talk, but um, yeah, just let me know.

Interviewer: Yeah. I have one question about [inaudible]. Do you think it's possible to interview someone from [inaudible] corpse?

U_4: Uh, are you interested in talking to somebody on the administrative side or you want to talk to like the team?

Interviewer: I think the team like hike, how they think, how it helps the innovation mindset when they support students because I think it's a market discovery program right. Where it is students to get their ideas and like,

Interviewer: yeah I would be interested in that night to know more about like how they help the students and like to develop this innovation mindset.

U_4: Yeah. Let me talk to the program administrator and then get back to you on that. If there is somebody, maybe I can do like a dip, a double dip because some of your students who are going through the process or um, uh, the students start a fund also went through the iCore program. Talk to them from there. Like on their perspective, like how the students start startup fund has health and what is the motivation for going through like the iCore program as well. Yeah. But I'll get back to you.

Interviewer: Okay, nice. And also maybe the innovation advisors, I'm not sure if you're in touch with them. Like the company advisors that help students.

U_4: Um, I don't run that program, but I can find out.

Interviewer: Yeah, it would be great. Yeah. Yeah, yeah. Thank you so much for your support. It's really interesting to get insights into UCI because so many programs and supported, it's really nice because I'm like studying in Sweden and there is not that common to like support the innovation mindset of students that much. So that's an interesting,

E. Appendix: Interview transcripts

U_4: we actually have a, a student from Sweden last year who came here for like a, um, in like extension program with, um, the divisions of the department of like continuing education to learn more about like the whole innovation process. And she was actually an intern at the ant center, so she helped build some of the programming that we're running now and center. So it'll be, um, John would be able to give you more info on what the student did. But that's interesting that you guys are exploring like, uh, the, the innovation and entrepreneurial mindset world here in the U S

Interviewer: yeah. Yeah. Cool.

U_4: Okay, perfect.

Interviewer: He was so much, was really interesting talking to you.

U_4: Yeah, you too. Thank you. And we'll, we'll be, um, I'll connect with you via email afterwards.

Interviewer: Okay. Thank you. Okay, great day. Bye.