



JÖNKÖPING UNIVERSITY

*Jönköping International  
Business School*

# Challenges in University- Industry Collaborations

Organisational Differences Leading to Challenges in  
University-Industry Collaborations in Student-Based  
Innovative Projects

**MASTER PROJECT**

**THESIS WITHIN:** *General Management*

**NUMBER OF CREDITS:** *15 Credits*

**PROGRAMME OF STUDY:** *Engineering Management*

**AUTHORS:** *David Casado Lopez and Johannes Fussenegger*

# Master Thesis in General Management

Title: Challenges in University-Industry Collaborations

Authors: David Casado Lopez and Johannes Fussenegger

Tutor: Jonas Dahlqvist

Date: 2021-05-24

**Key terms:** university-industry collaborations, innovation, SMEs, organisational differences, student-based projects

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## Abstract

**Background:** Collaborations between universities and industries are common to foster innovation in small and medium-sized enterprises. Participants of these collaborations face several challenges related to these collaborations. Universities and Industries work in different environments and value different priorities. Current literature shows that the challenges due to the organisational differences in these collaborations lead to the most significant challenges.

**Purpose:** The purpose of this study is to explore and analyse how participants of UI collaborations perceive and manage organisational differences between universities and industries when the industry participant is a SME and the academic are students. We also aspire to discover and outline some specific characteristics of the organisational differences appearing in student-SME collaborations.

**Method:** To fulfil the purpose, a qualitative study was conducted. The empirical data was collected in ten semi-structured interviews. Two projects of two master programmes at Jönköping University and experienced facilitators of university-industry collaborations were interviewed. The focus of the interviews was to get to know the participants' experience related to the organisational differences.

**Conclusion:** The study's findings show how organisational differences in student-SME collaborations are perceived differently than in generic UI collaborations. Three elements were found as the main aspects influencing the perception of the organisational differences in student-SME projects: *individual factors*, *perspective* and *collaborative factors*. Finally, the findings show a positive contribution towards innovation in the SME participating in these projects.

## **Foreword**

We, David and Johannes, would like to thank our supervisor Jonas Dahlqvist for the guidance, support and feedback we received throughout the process. Not to forget our colleagues from the seminar who gave us enriching insights and feedback for this thesis. Despite living in these unusual times due to the covid-19 pandemic, we feel grateful that we had the chance to write this thesis at Jönköping International Business School.

We would also want to extend our appreciation to the students, company representatives, facilitators and experts who took the time out of their busy agendas to make this study possible.

Last but not least, we would like to thank our families and closest friends for their unconditional love and support during the process.

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# 1. Introduction

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*The purpose of this chapter is to introduce the reader to the topic of the master thesis. The chapter starts by giving some background information about the topic. A general description of the problem, the purpose statement and the research question will follow.*

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## 1.1 University-industry collaborations in innovative environments

### 1.1.1 Innovation and SMEs

Small and medium-sized enterprises (SMEs) represent the backbone of the economy in Europe, as around 99% of the businesses in Europe are SMEs. In total, SMEs generate 50% of Europe's gross domestic product (GDP). They employ approximately 100 million people where two out of three jobs are in a SME (European Commission, 2016; European Commission. Directorate General for Communication., 2020). According to the EU recommendation 2003/361 (European Commission, 2003), the companies which employ fewer than 250 people, which annual turnover is not exceeding 50 million EUR or whose annual balance sheet is not exceeding 43 million EUR, are defined as SMEs.

The European Union supports SMEs in many ways and tries to establish the full potential (European Commission. Directorate General for Communication., 2020). Regional policymakers focus on transferring knowledge between academia and the industry to benefit their regional innovation system (Morisson & Pattinson, 2020). To create an innovative environment, it is often not enough to just use the own internal resources of a company and work with the resources inside the firm. A collaboration between more parties is needed in a particular ecosystem that requires working together with parties outside of the boundaries of the particular organisation (O'Connor et al., 2018). In an ecosystem, different parties act together to achieve their common goal. All the parties use resources, and the collaboration depends on all members of the system (Chinta & Sussan, 2018). An innovative ecosystem combines experts from different parties and allows a network of collaborators to achieve more than a member alone can drive. The collaboration between the parties creates value. Other than firms, these ecosystem members can be public institutions and governments, research centres and universities (De Bernardi et al., 2020).

### 1.1.2 SMEs and collaborations

An innovative ecosystem that becomes increasingly important and has a long history is the collaboration between universities, industries, and governments. Combining these three parties has become essential for the continued growth of industries and their innovative mindset, referred to as the triple helix model (Leydesdorff & Etzkowitz, 1998); (Chinta & Sussan, 2018). Over time, universities further developed from developing fundamental knowledge and academic research into a more pragmatic



approach for developing new technology, new products, new processes, and new businesses (Chinta & Sussan, 2018).

In the current and future scenarios, companies must adapt fast and develop the ability to create disruptive responses to keep being competitive and sustainable in the long term (Bertello et al., 2021). Casadella & Uzunidis (2017) define innovation as an essential agent for growth and technological competitiveness in developed societies, despite being considered a luxury in some developing countries. The collaboration with other companies or institutions can often lead to more successful innovation

When companies are collaborating with other companies or institutions, it often leads to more successful innovation. In order to stay competitive, companies should prioritise collaborations. The exchange of knowledge can be very beneficial for companies, reduces innovation costs and maximise competitive market advantage (González-Benito et al., 2016).

Examples of successful collaborations go back until the late 19<sup>th</sup> century and the early 20<sup>th</sup> century, as universities in America already supported the agriculture community (Rosenberg & Nelson, 1994). More current examples and role models in collaborations are IBM, Microsoft and Google (Chinta & Sussan, 2018). Even though leading companies show that the collaborative model is working, many SMEs are not collaborating with producers of knowledge outside of their company, according to Kaufmann and Tödting (2002).

### 1.1.3 Collaborations with students

Scholars have suggested that the industry should start cooperating with students to get to know the academic side and experience collaborating with academia to foster collaboration and promote future projects (Kurdve et al., 2020). SMEs could also use students to overcome the barrier of a lack of resources in these collaborations (Bertello et al., 2021) and network and interact with students to be innovative (Apa et al., 2020). Students can be involved in internships or thesis projects, and projects can be carried out through a course at university. The students benefit from learning, and the industry benefits from the student's work and perspectives (Zukarnain et al., 2020).

### 1.1.4 Challenges in the collaboration

SMEs are especially struggling while working and collaborating with universities (Laursen & Salter, 2004). Some barriers and challenges faced in the process are lack of resources for innovation, lack of human resources, lack of innovation strategy, and lack of common goals with the rest of the participants of the collaborative projects (Bertello et al., 2021). Apart from the SMEs' inherent problems, some challenges arise when academia and industry work together. The differences in the structures of both organisations generate the biggest challenges in these collaborations. Challenges that occurred due to these organisational differences between the industry and the university

are often why SMEs are not collaborating with universities or other research organisations again (Elmuti et al., 2005; van de Vrande et al., 2009; Vries et al., 2019).

## **1.2 Problem statement**

As already mentioned, several challenges impact the success of the collaboration between university and industry. The challenges caused by organisational differences are part of other challenges (Bertello et al., 2021). However, challenges caused due to the organisational differences of universities and industries are the most common challenges in university-industry (UI) collaborations (Elmuti et al., 2005; van de Vrande et al., 2009). Industries and universities are settled down in different institutional environments and follow a different set of priorities. A university's structure is strict and not as flexible as the structure of a firm (Valentín, 2000). Despite there is current knowledge about these challenges occurring from these organisational differences, there is a gap regarding how different collaborations overcome these challenges. Especially when students are involved (student-based projects) in the collaborations, there is a lack of knowledge on how these organisational differences affect the collaboration. Student-based projects are a common way to organise these collaborations (Sannö et al., 2018). Scholars suggest involving students in UI collaborations to use synergies and share experience (Zukarnain et al., 2020). SMEs especially face a lack of resources (Bertello et al., 2021). Interacting with universities and students allows SMEs to create future networks and create an innovative environment (Apa et al., 2020).

## **1.3 Purpose of the study**

The purpose of this study is to explore and analyse how participants of UI collaborations perceive and manage organisational differences between universities and industries when the industry participant is a SME and the academic are students. We also aspire to discover and outline some specific characteristics of the organisational differences appearing in student-SME collaborations.

## 2. Theoretical Frame of Reference

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*The following chapter presents the theoretical frame of reference of the present study. First, it defines innovation and gives a general overview of innovation and innovation in SMEs. The following part gives a general overview of university-industry collaborations. Finally, it describes the challenges these collaborations face and provides the framework used for this study.*

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### 2.1 Innovation

#### 2.1.1 The basic concept of innovation

Schumpeter (1942) defined innovation as the base of economic change and described it as a “creative destruction”. Innovation is desegregated into five different types depending on which element is applied: new product, production process, new market (or business model), new resources or raw material and a new industrial structure (Schumpeter, 1934).

Although the Schumpeterian approach is quite accepted, scholars have no consensus regarding innovation, entrepreneurship, and their relation (Zhao, 2005). Other scholars such as Miller (1983) define innovation as a critical element of entrepreneurship among other risk-taking and proactivity elements. Peter Drucker (2002) defines innovation as the work of knowing rather than doing, differentiating it from other corporate functions. Kline & Rosenberg (1986) insist that innovation is not a punctual and homogenous thing but a process. An innovation sometimes does not have an impact as a game-changer. The added improvements on it involving interrelated innovations are what make the innovation economically significant. When defining innovation, more factors to consider are the significant amount of required resources, the risks and uncertainty associated with it. The levels of risk and uncertainty depend on the degree of the radicalness of the innovation applied and the change of the new technology (Kline & Rosenberg, 1986; Van de Ven, 1986). Innovative decisions require dealing with new behaviours and unpredictable processes (Hurst, 1982). If not all the information is evident and accessible in complex situations and people feel they do not have the required level of knowledge, people tend to face uncertainty (Brashers, 2001).

These different approaches on how radical innovation is or where it is impacting (product, process, economy, etc.) shows that innovation is something broad that can be related to different things. In this sense, Cooper (1998) sets a definition of the different dimensions of innovation. In the research, he breaks up the multiple dimensions of innovation into more minor but significant dualities.

The dualisms provided by Cooper (1998) are the following ones:

- radical versus incremental;
- product versus process;
- administrative versus technological

It is interesting to know how innovation affects the company's performance and how innovation can be improved in practical terms. Researchers differentiate between three different innovative perspectives. Researchers try to see the different impact on the final company performance (Rosenbusch et al., 2011). They differentiate between:

- the innovation orientation of the company,
- the inputs (money, resources) dedicated to innovation processes,
- and the outputs emerged from the innovation processes of the company.

Finally, researchers also differentiate between:

1. Internal or closed innovation: Internal R&D, closed innovation processes, and
2. External or open innovation: the one in which the innovation process is undertaken in collaboration with external organisations (Chesbrough, 2003).

Innovation is a complex phenomenon that requires combining technical and marketing knowledge when the market asks for that innovative solution. Therefore, investing in the R&D department is not enough to innovate (Kline & Rosenberg, 1986). This necessity of mixing different areas of knowledge and other factors such as increased workers rotation made the closed innovation model less interesting for companies in the past years (Chesbrough, 2003).

### 2.1.2 Innovation in SMEs

Innovation can bring a competitive advantage for companies. In the current and future scenarios, companies and especially SMEs, must adapt fast and develop the ability to create disruptive responses to stay competitive (Bertello et al., 2021). Despite the competitive advantage that it can create, innovation can fail when bringing new products to the market (Berggren & Nacher, 2001). Using too tight control on budget and same financial tools for current existing business than for innovative projects can sabotage innovation. Therefore, big firms are setting innovative structures (Christensen et al., 2008; Moss Kanter, 2006). When looking at companies such as Apple, it can be observed that they are organised by using a unique organisational design and an associated leadership model that fosters innovation within the company. Insulating product decisions from short-term profit, cost targets and financial pressures are some of the actions taken by this company (Podolny & Hansen, 2020). Even though innovation can end as a failure, big companies can afford it. Some SMEs cannot afford it, and therefore, it is harder for SMEs to innovate (Berggren & Nacher, 2001).

As Kline & Rosenberg (1986) stated, innovation will be the price to pay to stay in the market. SMEs will also be forced to innovate if they want to keep competing with big companies. Companies must take risks on innovation investments, and SMEs tend to risk less than big companies' managers due to the constant risk faced by the owner. Due to this permanent risk and focus on family income and personal goals, small business owners are not interested in innovation and creativity (Stewart et al., 1999). Although some risks must be handled, having an innovation orientation can allow companies to create more value by improving resource allocation, attracting skilled employees, and improving the company's risk-analysis capabilities (Rosenbusch et al., 2011).

Some scholars propose that SMEs have unique characteristics that would make them competitive in terms of innovation. Due to their flexible hierarchies, quick decision-making and nimbleness, SMEs can adapt fast to the market. That leads to a competitive advantage in comparison to big companies. Innovations based on new market behaviours or new incongruences of the market gives them an advantage compared to big organisations, but only if they are faster than them (Drucker, 2002). Even though SMEs are sometimes not interested in creativity and innovation, a recent meta-study on the impact of innovation in SMEs shows how in general terms, innovation has a positive impact on the economic performance of the analysed SMEs (Rosenbusch et al., 2011).

### 2.1.3 External collaboration in SMEs

Scholars suggest using external collaborations to increase innovation capabilities by providing a network to SMEs. This network allows them to supply the lack of resources and capabilities to innovate (Apa et al., 2020). It is suggested to include the third part in charge of the organisation of the network, which acts as an intermediary between the SMEs and the external resources (Lee et al., 2010). The complexity and the risks for SMEs are big and important to consider when collaborating. Due to this complexity, risks and the project's duration, the costs and the property protection efforts increase (Rosenbusch et al., 2011). Other scholars differentiate between incremental and radical innovation. Due to the complexity of innovation, some scholars suggest SMEs to pursue radical innovation internally and use incremental innovation when collaborating with external partners (Christensen & Raynor, 2003). These external collaborations in SMEs are increasing due to the complexity of the new technologies and the necessity of different types of knowledge from several firms (Lee et al., 2010). Although it is known that SMEs are more adaptable and faster than big companies when innovating as a result of their structure, SMEs struggle in the implementation stage of innovation. Some lack resources and capabilities such as manufacturing capacity, project financing or sales and distribution networks. All in all, it is hard for SMEs to manage the whole innovation process by themselves (Edwards et al., 2005). Therefore, collaborations are necessary for SMEs to be innovative and stay in the market. (Kline & Rosenberg, 1986). Another way within the external collaborations is the partnership between universities and SMEs using innovation support programmes. This option increases

some capabilities and fosters collaborations with the university. Scholars recommend working with student projects as a first step when boosting innovation in SMEs through external collaborations (Kurdve et al., 2020).

## 2.2 University-industry collaboration

The traditional missions of universities are to conduct research and to spread knowledge through education. On the one hand, industries benefit from that by recruiting educated staff and on the other hand by reading and learning from scientific articles in different journals. Nowadays, industries also benefit from the third mission of universities, which is the collaboration between them to support the firms' innovation activities. These collaborations result in the development of new products, new services and new processes. Different types of organisations exist that offer innovation support programmes (Kurdve et al., 2020). Business-based technology centres or university-based research centres, which are in different kinds of connections to universities, are common to organise and build up these collaborations (Kaufmann & Todtling, 2002). These innovation-support-organisations in close connection to the university offer joint research projects (Lind et al., 2013) or coaching, training, and student projects as described by Sannö et al. (2018). The collaboration with universities to improve the firm's internal innovation activities is an essential factor to develop advanced innovations (Serrano-Bedia et al., 2012; Tödting et al., 2009). Crucial to mention is that if a firm only focuses on external innovation and collaboration, the impact on the innovation performance is decreasing. It is still vital for firms to invest in internal innovation activities to internalise and select which external knowledge is needed (Serrano-Bedia et al., 2012). Especially for SMEs, the internal sources of knowledge are the most critical factors for innovation development (Laursen & Salter, 2004).

### 2.2.1 The organisation of university-industry collaborations

Empirical data shows how many collaboration methods between universities and industries exist (Arundel & Geuna, 2004; D'Este & Patel, 2007; Faulkner & Senker, 1995; Odhiambo, 2015).

Dynamic knowledge transfer is about building knowledge through interaction (Tödting et al., 2006, 2009). University-based research centres are common to support the collaboration between universities and industries (Kaufmann & Todtling, 2002) to gain a competitive advantage (Serrano-Bedia et al., 2012). Lind et al. (2013) studied what different forms of collaborations between universities and industries in research centres can be identified. They concluded that the following four forms are present in research centres: *distanced*, *translated*, *specified*, and *developed*.

In a *distanced* form, the industry takes the distance to the organisation of the research process. The researchers have the freedom to set up the project within the area they discussed. In a *translated* collaboration, the process requires more involvement from the

firm to translate the overall specification of the goal into research agendas. In this way, the firms impact how the research is conducted but are not directly involved in the research activities. In a *specified* collaboration, the industry representatives order a specified research task that the researchers have to perform. That results in less freedom for the researchers, and researchers often cannot share the results due to secrecy reasons. Industrial firms benefit the most from the outputs of such collaborations and can just not allow the researchers to publish it (Lind et al., 2013). These projects are related to problem-solving and allow universities to engage in highly interactive projects (Perkmann & Walsh, 2009). The *specified* collaboration can also be defined as contract research, as the process follows an agreement made at the beginning of the collaboration in a contract (D'Este & Patel, 2007). The fourth and last collaboration is the *developed* one, where both sides of the collaborations are involved in research tasks and are of interest to industrial partners and academics. This way of collaborating is related to knowledge exchange (Dooley & Kirk, 2007; Lind et al., 2013). When complementing each other in their assets, it is possible to achieve the synergetic goals. Industries and universities can benefit from the collaboration (Dooley & Kirk, 2007).

### 2.2.2 Factors influencing the collaboration of Universities and Industries

Different factors have a different impact on how they influence the collaborations of SMEs and universities or research organisations. If the innovations are advanced, when there is a product new for the market, a higher internal R&D is required. Internal R&D departments require scientific inputs, which makes collaborations with universities or research centres beneficial. Nevertheless, R&D activities are also required for less advanced innovations when the product is known for the market but new to the firm. The requirements of R&D activities are small, and if external partners are used, it is more about the practical knowledge of service firms than the scientific knowledge of universities. The study also shows that the larger the firm, the less the problem is to work together with universities (Tödtling et al., 2009). Regarding the collaboration with universities, the location of the company or in what sector the company is doing its business does not matter for their innovative behaviour (D'Este & Patel, 2007; Tödtling et al., 2009). D'Este & Patel (2007) analysed the different channels of interaction in the UK and found out that the location has no impact on the interactions and collaborations. They are evenly spread around the country. However, the regional innovation systems are more likely to be found closer to universities or other research centres like science parks, innovation centres, technology transfer agencies and educational institutions, enhancing the production, diffusion and application of knowledge (Tödtling et al., 2006). Tödtling et al. (2009) found out that the more advanced the innovation is, the more valuable is the link between universities and industries. Laursen & Salter (2004) say that the firms that already work together with external sources like competitors, suppliers and customers, fairs and associations are more likely to collaborate with university research. High tech firms are not more likely to work with universities (Tödtling et al., 2009). However, firms with higher R&D capabilities are more likely to

work together with universities (Laursen & Salter, 2004). Outside help seems to be essential for firms once they fail in an external research project. This firm's chances of collaborating and networking again with universities or research organisations are high (Tödtling et al., 2009). The firm's size is a factor that positively relates to the possibility that the firm is collaborating with a university (Cohen et al., 2002; Laursen & Salter, 2004; Tödtling et al., 2009).

### 2.2.3 University SME collaboration

Bigliardi and Gatali (2016) identified four main factors that SMEs hinder from adopting open innovation in their companies in general: *knowledge*, *collaboration*, *organisational*, and *financial and strategic*. These factors represent the occurring fears that firms have during an open innovation process.

Dufor and Son (2015) identified four dimensions SMEs have to stimulate and manage when working with open innovation. The four dimensions are corporate culture, networking, organisational structure, and knowledge management systems. Dufor and Son (2015) elaborate on the organisational changes regarding these four dimensions and analyse how a company can overcome the barriers related to the change from closed to open innovation. Knowledge barriers are common in knowledge-intensive firms that are mainly micro-seized. A lot of medium-innovative firms perceive financial and strategic risk as the biggest barrier. SMEs which are doing their business in less innovative industries pointed out that the biggest barriers for them are the collaboration and the organisational ones (Bigliardi & Galati, 2016).

As already mentioned, the bigger the firm's size, the more likely it is to collaborate with universities (Laursen & Salter, 2004; Tödtling et al., 2009). Laursen and Salter (2004) argue that SMEs struggle to collaborate with universities for innovation purposes in general. The structure of collaborating with universities and research centres also differs from larger firms than SMEs (Laursen & Salter, 2004). Kaufmann and Tödtling (2002) agree with that and say that SMEs cannot be structured and organised in the same way as large firms to gain unique knowledge in collaborations with external parties, such as universities. Challenges in established SMEs (less in Startups) are often that their staff's level of education is not that high. That results in less motivation to collaborate with universities to be innovative (Kaufmann & Tödtling, 2002; Laursen & Salter, 2004). Key staff who would connect with universities are often too busy with the day-to-day business. Therefore, there is no time for extra hours to spend on research. Next to the staff's education level, a lack of financial resources or a small product range are additional barriers for SMEs to collaborate and process research with universities (Kaufmann & Tödtling, 2002).

Vries et al. (2019) recommend starting with internships or thesis projects to get used to the partner before working on more significant research projects. Offering internship positions for students to work at the project level in collaborations might also help at the



beginning to activate the collaboration for future success (Bertello et al., 2021). Kurdve et al. (2020) agree and suggest that it might be helpful to start with student projects to learn how to collaborate. The firm can learn about the partner and its capabilities for future collaborations (Vries et al., 2019). A research centre developed into academia and industry can support the translational collaboration between SMEs and industries. When collaborating with research centres, SMEs develop their collaboration skills and absorption capacity (Kurdve et al., 2020).

#### 2.2.4 Challenges for SMEs in University-Industry Collaborations

SMEs struggle to collaborate with universities and are less likely to be involved in this kind of interactions. Once SMEs have overcome these barriers of starting to interact with universities, they are motivated to use every channel to work and network with universities (Tödting et al., 2009).

Van de Vrande et al. (2009) identified that the biggest challenge for SMEs when collaborating in open innovation projects are the problems related to corporate culture. Elmuti et al. (2005) identified that the differing organisational cultures in these collaborations could lead to problems as the parties might have different timescales, objectives to fulfil, and different value systems. The different institutional environments of universities and industries lead them to different priorities (Valentín, 2000). Balancing these differences and aspects is a considerable challenge (Elmuti et al., 2005). In a systematic literature review, Vries et al. (2019) discover that these organisational challenges are often mentioned in the existing literature regarding the collaboration between SMEs and universities. Organisational differences can involve differences in the goals of the projects, expected outcomes, visions and required activities to conduct research, how time and the resources are allocated, different styles of management, social conducts, cognitive differences, differences in the language as well as the perception of time (Vries et al., 2019).

A high number of heterogeneities is another challenge that impacts these collaborations, often in the execution phase. It is different characters, values and cultures that come to work together that make the collaboration complicated. Researchers often complain that the company is not providing the necessary information to continue with the research. This mainly has two reasons: First of all, SMEs want to keep their knowledge as a secret as much as possible, which results in a lack of motivation. Second, traditional SMEs often do not have the informational system required to provide the researchers with the information they would like. On the other hand, SMEs often complain about the weak effort the academic partner puts on into their collaboration (Bertello et al., 2021).

Previous research shows that the closer university and industry interact, the less the organisational differences are there. Due to experience, the parties in a collaboration know the point of view of the other partner (Bjerregaard, 2010). Quantitative studies

show that the collaboration process is affected by organisational differences (Galan-Muros & Plewa, 2016; Ghauri & Rosendo-Rios, 2016).

The organisational challenges are followed by the challenges that limited time and resources produce (van de Vrande et al., 2009). Limited time and resources in SMEs lead to SMEs not mapping their partner before the collaboration. They would be aware of the importance of getting to know the partners beforehand to collaborate successfully, but time and resources (especially human resources) do not allow most SMEs. Another challenge that UI collaboration faces in the planning phase is that SMEs often do not integrate the project into their medium- or long-term vision. For many SMEs, the only important thing is to minimise costs, and the value of co-creation is not of great importance (Bertello et al., 2021). Other challenges are administrative burdens (Bertello et al., 2021; van de Vrande et al., 2009). Administrative challenges are relevant in the monitoring phase of a project. If the government gives funds to the company, these administrative tasks rise even more. It requires a considerable effort to document and report the project's activities to receive the grants. It becomes a challenge for many SMEs with limited human resources and less developed informational systems (Bertello et al., 2021). The mentioned challenges often lead to delays in the delivery of the projects. If that happens, companies lose the motivation to collaborate with universities again and leave to their day-to-day business. Overall, SMEs often do not even think about working together with universities again. Possible synergies are not often used for subprojects that evolve from the first collaboration project (Bertello et al., 2021).

### 2.2.5 The organisational differences

As discussed in chapter 2.2.4, the challenges related to the organisational differences impact the collaborations between SMEs and universities the most. The main organisational differences are described below.

#### **Perception of time**

The considerations towards the time perspective affect the behaviours of both universities and companies. The decisions taken by the participants during the project are affected by their time orientation. Time orientation can be disaggregated into three different levels: past, present and future orientation (Merchant et al., 2014). Individuals or organisations oriented towards the present will take more impulsive actions and risks and are oriented towards short-term goals. On the other hand, future-oriented individuals or organisations will relate immediate decisions to future objectives. Their decisions will be less impulsive and risky, and they will sacrifice current benefits for future achievement. Although it can be different from project to project, in this type of collaborations, the present-oriented behaviour is usually identified by scholars on SMEs due to their time pressure and workers rotation, while university focus on long term academic findings and consistent procedures (Bertello et al., 2021; Galan-Muros &

Plewa, 2016; Merchant et al., 2014). On the other hand, scholars seem to fail to meet deadlines, which is also harmful to the project (Ghauri & Rosendo-Rios, 2016). The importance of being aligned in terms of the perception of time is fundamental for succeeding in this kind of collaborations. It is also crucial to be aware of this organisational difference and set real-time planning that must be respected. Planning unreal outcomes in terms of time and adding pressure in the middle of the projects can cause frustration and reduce the participants' interest and commitment (Barnes et al., 2002).

### **Different goals and objectives**

The primary motivation for universities is to generate and disseminate knowledge and create theory (Galan-Muros & Plewa, 2016). On the other hand, companies are trying to apply the knowledge to generate a short-term profit. These differences affect the definition of the goals and expected outputs of the projects. Different goals mainly occur in the execution phase of a project. Having different goals in a collaborative research project can slow the whole project down because of the redefinition of objectives. Often, the project leader tries to redefine the objectives and goals that every party achieves at least the minimum aspects of the goals to receive the funds. This impacts the co-value creation in the project negatively (Bertello et al., 2021). Some studies suggest overcoming the challenges of having different goals by defining them as early as possible in the project phase and using a project plan (Canhoto et al., 2016; Morandi, 2013). The challenging factor is that it can be hard to define these goals at the beginning of the project, and these goals will get more explicit in the engagement phase of the project (Estrada et al., 2016; Plewa et al., 2013).

### **Market orientation**

Private companies are generating more patents than universities. Universities are often far away from commercialising their research than industries (Fisher & Klein, 2003). Market orientation is necessary for companies to become more competitive in a sustainable way (Castro et al., 2005). Market orientation is one of the factors that can harm the project if it is not well monitored. It can affect both short-term and long-term relations and is one of the most important factors to consider when it comes to success in UI collaboration. To care about customer values and market needs is critical to guarantee a positive experience in the project (Ghauri & Rosendo-Rios, 2016). This factor should be tracked carefully to ensure that changes in the market or customer values do not change critically or repetitively, affecting the performance of the research. Furthermore, the opposite situation could also be harmful if all the importance is given to the industrial benefit and researchers' needs are not considered. To balance market necessities with research requirements, taking into account the interests of both parties is essential for the long-term sustainability of these type of collaborations due to the university's need for consistent research and the companies necessity of accessing the market (Barnes et al., 2002; Ghauri & Rosendo-Rios, 2016; Hasche et al., 2020).

## **Communication styles**

Open and effective communication is an essential factor and determines the success of UI collaborations (McNichols, 2010). Often project teams experience problems related to communication due to the use of different languages from the industry and the academic side. Communication problems often lead to misunderstandings during the project. If fundamental values differ too much between universities and industries, the communication between the two parties is negatively affected (Muscio & Pozzali, 2013). Next to using different language and terminology, distinct communication styles can deteriorate the collaboration (Mitton et al., 2007; Muscio & Pozzali, 2013; Plewa et al., 2005).

## **Secrecy**

Secrecy is another notable organisational difference between these two organisations (Sjöö & Hellström, 2019). It is observed how publication rates decrease when the research is developed through collaborations with industry partners, who roughly insist on protecting intellectual property through secrecy or patenting (Bikard et al., 2019). Some researchers define secrecy as a barrier that negatively affects collaborations (Tartari & Breschi, 1996). It has been exposed that some scholars are worried about the fact that industrial orientation and economic benefits can erode the initial openness that defines traditional academic culture. Therefore, academia feels that their values are not considered in these types of collaborations. Sometimes collaborations can include both commercial and scientific potential, and for those cases, traditional research values are not in jeopardy and this proximity to industry doesn't necessarily force secrecy (Bikard et al., 2019).

## **2.3 Summarizing the theoretical frame of reference**

As mentioned in chapter 2.2.5, the biggest challenges for UI collaborations are the challenges that occur due to the organisational differences between university and industry. As seen in the theoretical framework and as identified by Vries (2019), the current literature shows that many authors identified these organisational differences. Researchers identified the barriers to why SMEs are not interacting with universities. The current research lacks in the initiation and collaboration phase of collaborative projects between universities and SMEs. As shown by Bertello (2021) or by Elmuti (2005), the organisational differences impact these collaborations in this phase. How these organisational challenges during the collaboration phase have been solved has not been conducted in research yet. The current research was often on the academic perspective and less on the firm's perspective, especially when students were involved in the research project (Vries et al., 2019). As suggested, SMEs can work with students to get to know academia and solve some barriers regarding collaborations, such as the lack of human resources for innovative projects (Bertello et al., 2021; Vries et al.,

2019). As scholars suggest, the present study focuses on the organisational differences in student-based UI collaborations.

## 2.4 Research model

Figure 2.1 illustrates the research model used in this study to identify how the organisational differences are perceived and managed in innovative student-based projects in SMEs. The model shows the two participants of the collaboration. The students on the academic side and the SMEs on the industry side. The following five organisational differences are presented between the two parties as to the main reasons for challenges in UI collaborations:

- Perception of time
- Different goals and objectives
- Market orientation
- Communication styles
- Secrecy

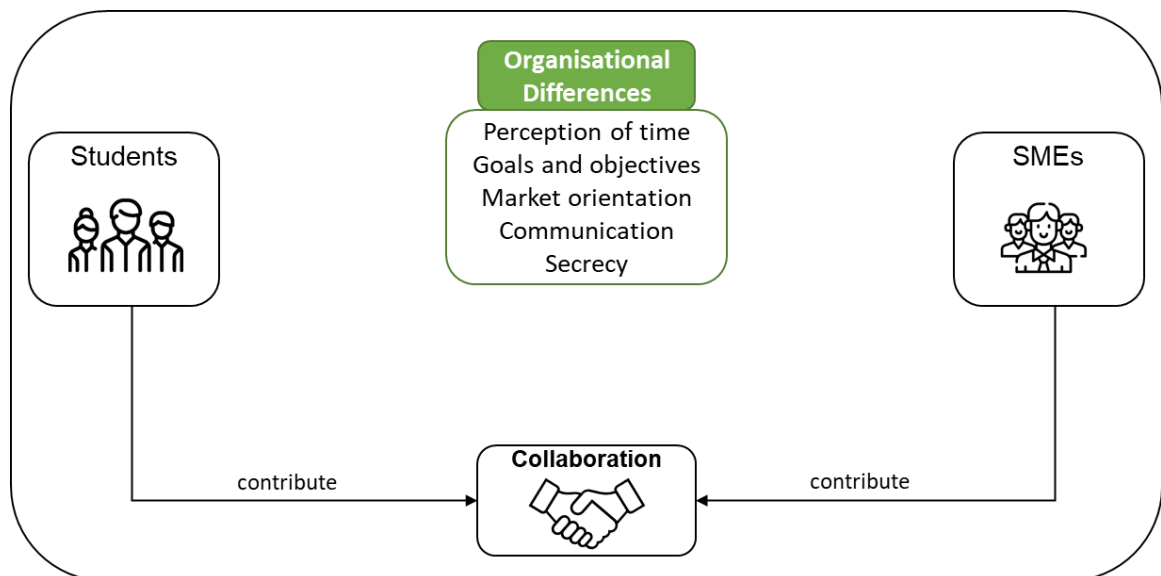


Figure 2.1: Research model

## 2.5 Research questions

Derived from the literature review and to fulfil the purpose of the present study, the following research questions (RQ) were formulated. As stated in previous sections, scholars consider that the most significant challenges observed in UI collaborations occur due to organisational differences. The present study aspires to analyse how these are perceived in student-SME collaborations to find specific characteristics emerging from these differences. Therefore, answering the research questions will contribute to understand how to deal with one of the main challenges of the collaborations.

Answering the questions will expose specific characteristics of the student-SME collaborations. It will reveal the relation of these cooperations with the willingness to keep collaborating and with the innovative impact on SMEs.

***RQ 1: How do participants of student-based UI collaborations perceive the organisational differences?***

From this research question, the following questions evolve:

*RQ 2: How are the organisational differences managed when students are involved in UI collaborations?*

*RQ 3: How do the organisational differences affect the willingness for future collaborations?*

*RQ 4: How is the relation of UI collaborations between the projects and the innovation of small and medium-sized enterprises when students are involved?*

### 3. Methodology

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*This chapter shows the way how the research of this present study was conducted. It explains the researcher's worldview and the methods and techniques used to come up with a conclusion. The chapter explains why these methods and techniques were used, and the reader will understand how the research was conducted.*

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#### 3.1 World view

In UI collaborations, different people with different experience and background work together for a common goal. No project or collaboration is the same as another, as the participants or the whole purpose of the project can be different. Understanding the challenges that occurred due to universities' and industries' different cultures requires consideration of different perspectives. The industry representatives might perceive the challenge differently than the academic participants in the projects. It depends on how this team of individuals solves the challenges together for the common goal of the project. The team members will use their own experience to solve the challenges. Every individual is affected differently by organisational differences. For this reason, we consider that a **relativistic ontology** is needed to work with this approach and to find out how the organisational challenges were solved and perceived by different projects. We accept that there are many truths and that it depends on whom they interact with. For this reason, we see the interaction with different people in a team, especially from different parties, as different perspectives regarding the perception of the organisational differences. Every team has a unique way of recognising and solving challenges. Different teams solve specific organisational challenges with different solutions (Easterby-Smith et al., 2018).

As the unit of analysis are projects in which universities and industries are collaborating, it requires including and understanding the complexity of these projects, which speaks for a **social constructionism epistemology**. Another fact why we use the social constructionism approach is because we consider that reality is not objective and externally as it would be in a positivistic approach. We think that people give meaning to the reality by their interaction in these projects with each other. By interviewing people in these collaborations and interacting with them, we want to find out how they make sense of these projects' challenges. The goal is to find out how the people in the project perceived and solved the challenge. It depends on what they feel and how they use their experience instead of measuring hard facts, which also speaks for the social constructionism approach (Easterby-Smith et al., 2018).

#### 3.2 Approach

Following the constructionist epistemology described in the previous chapter, the approach is to generate theory in this qualitative study. We gave meaning to the dataset by identifying how different project participants perceived and solved the challenges

due to the organisational differences. That allows finding patterns and relations in the data (Dudovskiy, 2018). Easterby Smith et al. (2018) described that constructionism epistemology is used to generate theory and not test a theory. Given this, the present study follows an inductive approach. Existing literature is analysed in the theoretical frame of reference, and the results of this study will enrich existing literature with a new theory. Reviewing the current literature and the theoretical framework allowed us to define the direction of the present study.

### **3.3 Research Design**

The existing literature on UI collaboration shows that qualitative studies allowed deeper and better insights into this topic (Vries et al., 2019). The present study will build theory based on a qualitative design of the study. Grounded theory is used to build the theory and follow the approach of the research. This ‘comparative method’ develops theory by analysing similar events or processes in different settings or situations (Glaser & Strauss, 1967). This allows us to collect data from different situations in UI collaborations when students were involved. We used the approach by Strauss, who said that it is crucial to familiarise with the current literature to make sense out of it as the theoretical framework about the organisational challenges demonstrates (Corbin & Strauss, 2015; Strauss, 1987). The current literature identified challenges, which are put in a meaningful theoretical framework in this study to analyse how participants of UI collaborations solved these challenges. The constant comparison between situations in different setups in the present study allows us to evolve theory (Easterby-Smith et al., 2018). As for us, the experiences of the study’s subjects and their experience with dealing with organisational challenges is essential. We follow the approach by Charmaz (2000). In her approach, “the viewer creates the data and ensuing analysis through interaction with the viewed” (Charmaz, 2000, p. 523). Interviews with participants of UI collaborations will be conducted to understand the different perspective in the team regarding the challenges faced.

### **3.4 Data Collection**

In this qualitative study, data was collected in semi-structured interviews. Qualitative data is formed in an interactive and interpretative process and developed. To collect qualitative data in interviews, they need to be prepared, conducted and transcribed. The questions in qualitative research are often open-ended in an explorative nature. Therefore, it is essential to record the interaction between us and the participant (Easterby-Smith et al., 2018). All the interviews were conducted online. Using qualitative interviews allowed us to gain insights into people’s experiences and solutions regarding organisational challenges in UI collaborations. Besides conducting interviews, it is hard to get the data needed for the analysis of this study. Observations would not have made sense, as we would not get the insights into the participants’ experience. We would have to be involved from the beginning to the end and participate in every project meeting to get the same insights as from interviews. We decided to do



semi-structured interviews as it sometimes might depend on the person’s perspective, and in some cases, deeper insights about a perceived challenge are needed. Structured interviews would not allow us to go into more detailed experiences or feelings of the person when we think it could be helpful for the outcome of the study. As already mentioned, semi-structured interviews are conducted, as they give, according to Easterby Smith et al. (2018), more confidentiality. The interviewees' replies are usually more personal in semi-structured interviews, which fits the primary goal of finding out more about how the challenges are experienced and solved in UI collaborations.

Table 3.1 illustrates the information about the interviewees. In total, ten interviews were done. Six interviews were with participants from two different projects, and four interviews were with experienced persons in UI collaborations who will be referred to as experts.

*Table 3.1: Information of participants of the study*

<i>Participant</i>	<i>Category</i>	<i>Function</i>	<i>Time</i>
<i>P1</i>	Project A	Student	71 min
<i>P2</i>	Project A	Company representative	50 min
<i>P3</i>	Project A	Student	40 min
<i>P4</i>	Project B	Student	52 min
<i>P5</i>	Project B	Business coach	53 min
<i>P6</i>	Project B	Student	62 min
<i>P7</i>	Expert	Commercialising support	43 min
<i>P8</i>	Expert	Coach/Facilitator	48 min
<i>P9</i>	Expert	Coach/Facilitator	57 min
<i>P10</i>	Expert	Academic contribution	68 min

## **Interview guide**

This section gives a short overview of the topics discussed in the interviews. The more detailed main questions, as well as supporting questions, can be found in appendix 1.

### **The background of the interviewee**

The participant's background in terms of education, working experience, and nationality was needed to link these factors with the perceived challenges in the collaborations.

### **General information about the collaboration**

To understand how the collaboration was organised, we asked questions regarding the organisation and general information about the project.

### **Challenges due to the organisational differences of university and industry in the collaborations**

This topic was the central part of the interview. We introduced each organisational difference based on the description in chapter 2.2.5. We asked in a very open way if the participant experienced a challenge occurring from this organisational difference. We expected and also received long answers on that first open question per organisational difference. Backup questions were used to get even more insights into the participant's experience.

### **The overall impact of the organisational difference**

This topic was used as a recap of the perceived challenges. The primary purpose was to determine whether the perceived challenges impacted the participant's willingness for future collaborations, the learning, the overall performance of the project, and the project's goal. The participants had as well the chance to add more information to the perceived differences if needed.

### **Connection to innovation**

The last topic was used to find out more about the relation to the project and innovation. We identified the innovative contribution of the participant through the project and the result in terms of innovation for the company.

## **3.5 Case Selection**

The participants were selected based on a purposive sampling strategy. The criterion to choose the participants was that they were part of a UI collaboration in the past. Following this criterion, the interviewed persons are master students, company representatives, and other participants in these projects, such as facilitators who coach the students. Participants are first screened to check if they fit into this criterion, and we decided then to continue with them or reject potential persons (Easterby-Smith et al., 2018). To find suitable projects, we contacted persons from the university and industry

side involved in these projects. These persons were able to forward us to people involved in these projects to have interview participants for the present study.

Two project teams were interviewed with participants from the industry as well as the academic side. Next to these project teams, we interviewed four individuals with experience in UI collaborations when students were involved. These persons were able to give insights into the different challenges related to the different cultures of universities and industries.

### 3.5.1 Project A

Project A was done within a marketing-related course within a master program at Jönköping International Business School. The teacher organised the team for this project, and in order to create the teams, a survey was fulfilled by the students. The teacher grouped students to get diverse groups in terms of nationalities, backgrounds, and professional experience. The team was composed of four students from different nationalities. The company participating was a SME that wanted to expand internationally, and the person in contact with the group was in a sales role. The students got a specified task from the industry, making this project a specified form of collaboration (see chapter 2.2.1). In this project, weekly digital meetings were not scheduled, and the team reached the company just if further information was needed.

### 3.5.2 Project B

Project B was done within an entrepreneurship-related course while studying a master program at Jönköping International Business School. The team for this project was organised by the teacher and facilitators who coached the students during the project. The teacher grouped students to get diverse and balanced groups regarding leadership, nationality, educational background, and professional experience. The team was composed of six students from different nationalities. In this project, the person in contact with the group was the CEO. A person from the marketing department was also part of the project. As in the previously described project, this project was also a specified form of collaborating as the task was given by the industry to fulfil by the team of students (see chapter 2.2.1). In this project, weekly digital meetings were scheduled, and the team was exposing their improvements and questions weekly.

### 3.5.3 Experts

The background of these “experts” in UI collaborations is diverse. Some experts are facilitators who coach the students as well as the company during the collaboration. Due to their working experience, these facilitators or coaches supported many student-based projects in collaboration with SMEs. Facilitators are part of University-Industry research centres. These centres are specialized in fostering innovation in local SMEs. Other experts are people who are experienced in many collaborations from the academic

side or who are connecting academia and industry. All the experts are actively participating in the collaborations.

### **3.6 Data analysis**

Grounded analysis was used to analyse the collected data in the present study. The grounded analysis allowed us to build theory from categories grounded in the collected data. Different data fragments are compared to each other, and the data is systematically analysed (Charmaz, 2014). We conducted the seven steps described by Easterby Smith et al. (2018) to develop the data analysis:

The familiarization with the collected data started already when transcribing the interviews. A transcribing software was used to transform the words from the audio files into text. Afterwards, we manually adjusted the transcriptions to the recorded audio file to match the text fully with the audio. After reading the transcripts, they were summarised to make sense of the data and reflect it on the study's research question and purpose. We split the data into themes to structure the data. After summarising the interviews, the first cycle coding was done to structure the data and build a framework mentioned in the third step, according to Easterby Smith et al. (2018). From this point on, the software 'MAXQDA Analytics Pro 2020' was used to analyse the data (Verbi GmbH, 2021). The software allowed us to follow a structured way of coding and organising the data. Memos were attached to the codes to have reminders and information at all the stages of the analysis. The memos gave us information about the thoughts and ideas we had regarding the specific codes. As soon as no codes were emerging from the data anymore, the conceptualization phase started. By identifying similarities, differences, frequencies and causations, we developed categories from the codes. The focused-recoding followed this step. Different weights were given to different codes using the memos created earlier and the original data to identify and highlight the essential aspects in the data. After this step, different patterns and links in the data and the codes were identified. These were needed for the inductive results of the present study. The last step was to discuss the findings and results with others to make the most out of the collected data.

In chapter four, the results are presented based on the organisational differences stated in the research model. The interviews are summarised in chapter four in connection with the factors identified in the analysis that impact the perception of the organisational differences. To get an overview of the emerging codes and themes in the data analysis, the hierarchical code models are listed in appendix 2.

### **3.7 Quality of the study**

The following chapter evaluates the study's trustworthiness according to the four dimensions stated by Guba (1981).

### 3.7.1 Credibility

We ensured the study's credibility and ensured that the findings fit to what was initially proposed (Guba, 1981). We had an initial talk with every participant of the study to ensure that we understand what the study is about and get to know each other to feel comfortable during the interview. This preventative action was also taken to get to know the participant's environment and build trust. The participants had the option to withdraw from the study at any point to make sure that the only persons involved in the study have the willingness to participate. Member checks identified as the single most vital action to ensure credibility (Guba, 1981) were done during the interview when summarising the perceived organisational differences by the participants and giving them the option to add and connect the experiences with the organisational differences. To get detailed data to form the participants, we used iterative questions for every perceived organisational difference to ensure that they did not contradict themselves in what they said.

Regular discussions and exchanges with the researcher's supervisor and colleagues from other thesis projects helped to ensure the present study's credibility. Alternative approaches and improvements were the focus of this discussion.

### 3.7.2 Transferability

The dimension transferability represents the possibility to apply the study's findings in similar contexts and not just to one specific situation (Guba, 1981). To make sure that the reader of the present study can judge if the findings can be used in a similar context, we provide, as suggested by Guba (1981), "thick" descriptive data. In the introduction, we introduced the topics included in the study to understand the context of the present thesis. Chapter two identified the gap in the literature and helped to craft the questions for the interview and choose the appropriate methodology. The description of the study participants in the methodology chapter contributes to the reader's understanding of the study's setting. The dimension transferability represents the possibility to apply the study's findings in similar contexts and not just to one specific situation (Guba, 1981).

### 3.7.3 Dependability

Dependability is about the stability of the study (Guba, 1981). The used methods in this study and the whole research process are well-argued and explained for future researchers to understand and repeat the work. We also ensured dependability by putting much effort into interpreting the data individually. Constant meetings were used to discuss the individual interpretation and develop a conclusion as a research team. We also read the transcripts several times and summarised the interviews to ensure the stability of the study.

### 3.7.4 Confirmability

The last dimension is regarding the confirmability of the study. This dimension is about the fact that our own biases do not impact the study's findings (Guba, 1981). We ensured that their backgrounds and personal experience did not impact the findings of the study. Through interaction with each other and talking about our own biases throughout the analysis process, we focused on facts emerging from the data only.

## 3.8 Ethical considerations

In this section, we expose the ethical considerations taken into account during the development of the study. In a qualitative study, the treatment can be challenging from an ethical point of view.

This study analyses the perceptions of participants in UI collaborations. Sensitive data was collected and analysed, and therefore ethical issues were seriously considered in this study. The following procedures exposed below were carried out to protect the interviewed participants and their expressed opinions. In this study, all the participants conducted the interviews in an absolute voluntary way and being aware that their participation could be withdrawn at any moment (Easterby-Smith et al., 2018).

We asked questions following the interview guide and using the knowledge acquired in previous interviews about the topic but always avoiding specific details from the project to avoid participants perceiving what other companions said about them, as Easterby-Smith et al. (2018) stated.

When it comes to data collection, several principles were followed to protect the participants of this study. To follow these principles, we applied them at every stage of the research (Bell & Bryman, 2007). Participants were respected at all times, making sure that no harm was caused during or after the process. The participants were informed about the process and the recording of the interviews and the usage of the collected information. We guaranteed that the privacy and dignity of the participants were respected and protected (Easterby-Smith et al., 2018). The information was confidential, and it was stored in local drives, avoiding the use of the cloud. The transcriptions of the interviews will be destroyed once the study is finished.

## 4. Results

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*The following chapter presents the data collected in the interviews. It summarises the participants' answers based on the five organisational differences stated in chapter 2, the relation to the innovation and the project's output.*

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### 4.1 Perception of time

None of the interviewed projects or the experts perceived the different perception of time in these projects as a problem, which did not lead to misunderstandings. Expert P7 pointed out:

*“You have to be quite open-minded, both as someone from the industry to understand the academia but also the other way around because it is two different worlds”.*

All the participants mentioned that failing to meet the deadline was not a problem either in the experienced collaborations. One experienced expert who acts as facilitator and coach for the master students pointed out that having the projects integrated into a course or programme helps everyone be on time. It can mean much work for the students if parallel courses are taken place on the one hand. The expert thinks that if the students would not have parallel courses, the deepness of the analysis could be more extensive and the result better. According to another expert, students often could not do as much as planned due to the available time. Most of the participants perceived the workload in collaborations with industries for the students as high and time-intense. On the other hand, some students mentioned that it motivated them to do an excellent job as the output affected the grade for the course.

Regarding the final output, expert P10 mentioned that it is essential to control a constant pace, and according to one expert:

*“There are other projects where you are called once a week (...), and then you tend to work more for them where the pressure is build-up.”*

One challenge regarding the time aspect is the lack of time on the industry side. Companies are perceived as very busy, and according to two participants of the present study, the academic and student side is seen as more agile. For expert P9, everything is about prioritising, and the participant stated:

*“(...) what is important right now, well I will make time for it.”*

The two student groups had no specific deadline from the company but a deadline from the course. The date to submit the final output was also the date to submit it to the company. Both groups planned deadlines for specific tasks internally. Student P1 of project A mentioned:

*“I definitely think it is super important to take track on all the deadlines, and I personally really liked having a plan.”*

The student clarified that this planning is essential due to previous working experience and experience in student projects. A challenge was that group members failed to meet their deadlines, leading to other people working overtime in project B. It was related to the individual’s culture for one student if participants deliver on time or not. Both of the projects were struggling in planning the tasks. Project B did not really understand what to do as of missing related experience. Project A did not know how long to plan for specific tasks due to missing experience.

Participant P4 considers that problems related to the group dynamics hindered the participants of project B from using the time well:

*“(…) that took a lot of time which we could have otherwise like used to focus on the task.”*

Regular meetings with the project coach helped project B to focus on essential parts of the project.

## **4.2 Different goals and objectives**

The biggest challenge perceived by one facilitator was to define the goals of the project and to make students understand them. In the analysed projects, goals were predefined by the university and industry. University defined the goals as per the academic boundaries and focusing on the companies’ goals and necessities.

One expert tries to let the students participate in the last step of defining the goals to help them understand them better. Student P6 felt that they should have participated in creating the goal:

*“I could not perceive the goal in the same way as them. Because I was not there when the goal was developed, and then I have to (…) get some time to understand the goal.”*

Based on the expert’s experience P8, companies know what they want to do. Students need to understand the goals, context, and market, which requires much information. It is even sometimes hard for the experts to comprehend fully:

*“Companies have been running their operations for maybe 10 or 20 years (…) it is very hard to fully understand their operations even having our own experience.”*

Experts and facilitators seemed to be aware of the uncertainty of the projects and complexity when understanding the goals. Expert P9 stated that it is hard to set goals in this kind of projects because in innovation projects, sometimes the goals are not 100% clear and are found on the way:



*“We have some few challenges with innovation projects. Innovation is navigating through something that you do not know, or you know very little about. You do not know how the road map is. You put a goal in front of you and say: well, we are going in that direction. But we do not know what we will find along the way.”*

Students did not find an organisational difference between their goals and the goals of the company. At the same time, students exposed that they struggled to understand what they were supposed to do and how to do it. They did not know how to approach the project, and they felt confused.

Participants also explained how hard it was for the team to understand the goal. They accepted the goals and did not try to change or adapt them to their interests or academic ways. Expert P8 stated that it is a success factor to have a business coach due to the time pressure and to support the students’ understanding:

*“There is too little time to understand the problem and the task plus students tend to forget the final goal”.*

Facilitator P5 stated that visiting the company made everything easier for students when understanding the goal and perceived frustration and lack of motivation due to many misunderstandings and a large amount of information. This participant specially insisted on the digitalization of the project due to the pandemic situation:

*“Despite these projects are never easy to clearly understand, not having so many physical meetings as past years made a huge difference and impacted the project negatively.”*

A student stated that they should have invested much more time understanding the goal to avoid losing time. Experts perceive that students did not invest time and effort in understanding the project's goals at the beginning of the collaboration.

Some tasks needed to be reworked due to a misunderstanding or slight change of the goal. It did not positively impact students who seemed confused and not manage uncertainty and changes in the scope well. Student P6 stated:

*“We thought we were supposed to do something, and then it turned out that that was not what we were supposed to do. So we had to redo, and then we thought yeah, ok, so this is what we had to do. And nope, and we had to redo it and yeah. So we went in circles.”*

Some experts highlight a success factor in understanding the background and the problem in terms of learnings for future collaborations. Student P4 considers it essential to have feedback on what the others understood within the team to avoid frustration and be aligned with the company for future projects and stated:

*“I feel like I would probably stress the communication more at the beginning and tried to get everybody on the same page.”*

One expert exposed as a critical factor for future projects to simplify goals, not take things for granted, increase the visits to the company and increase the feedback and motivation of the students. Student P4 considers that the business coach was essential in these projects.

*“It was really helpful from the coaches because (...) they stressed like the important parts of the projects or like the significant parts of the research. They highlighted (...) what will be very beneficial to have for our final presentation to the company.”*

### **4.3 Market orientation**

None of the students felt that their team was not aligned with the companies regarding the market orientation. The students’ previous working experience impacted the orientation towards the market. If students had experience in the same field, the market orientation was even higher.

At some point, these market-oriented students even felt frustrated when they had to step back to an academic perspective and when other students were not committed to the project. They were also caring about the grades but delivering something helpful was more critical for Student P1.

*“I worked in this field, so my perspective was really practical oriented (...) we really wanted to do something valuable and super interesting for the company.”*

Student P4, who did not have previous work experience related to the tasks of the project or the company’s products, felt a bit lost when following market-oriented tasks:

*“A lot of us just did not know where to look, and I know that a lot of us kind of got frustrated as well during the project. Due to so much confusion and just not really knowing clearly (...) how to approach the project.”*

Student P4 also exposed that the individuals with a low market orientation did not show as much commitment as others. Several participants agreed in the fact that not all the members were focused on delivering a valuable output to the company:

*“I guess our market orientation was different because they did not care at all. They did not even seem to care about their grade (...) it was a bit annoying.”*

Experts were aware of these differences in terms of the market orientation of the students and linked them to individual factors. Expert P8 stated:

*“It depends on your personality. What you are studying and if this was an interesting company for you or not. And then you have a side group that does not really care. They do it because they need to.”*

One expert exposed that it was necessary to push students most of the time either due to a lack of work experience or a tendency to read second line information instead of

directly working with the market's accurate information. Expert P8 did not know if it was important for students to present value:

*"I do not know if the students actually think it is important (...) your goal is, of course, that you pass the examination."*

The company representative P2 of project A was focused on the company and the output of the project:

*"I was quite egoistic and focusing on what the market looks like and which potential future partners we can contact."*

Expert P8 exposed that academia tried to contribute towards the company goals through practical models that companies can use to improve the long-term strategy:

*"We want them to take a little bit helicopter view of what they are doing and try to understand it."*

The business coach P5 of project B felt that there is a big gap when understanding customers and their strategy towards them:

*"Companies have a gap when it comes to understanding customers (...) they know the technical aspects and all these things, but it is really important to understand their customers."*

The coach P5 also exposed that companies are good at technical skills and are focused on profit, operations, and running the business. From their side, academia tries to contribute to fixing long-term strategic questions. The goal from an academic perspective was to bring value without getting stuck in models:

*"I think it is a challenge when you present like different models and to say ok why is this important (...) how is this turned into something relevant for the company that creates profit."*

Coach P5 also considers that doing the project in a digital format made things difficult and considers that visiting the company increased the market orientation of students dramatically:

*"It is just like this creative process, and understanding (...) gets harder. I have learned a lot, and I think all of us coaches learned a lot from doing it completely online. To visit the company made a huge difference".*

#### **4.4 Communication styles**

All the participants and experts perceived that the communication between students and the industry was on the same level. None of the participants perceived problems of having different styles of communicating. Some participants mentioned that cultural and

personal factors significantly impact how to communicate with each other. In terms of terminology, students had to adapt to the company, and student P4 stated:

*“(...) we did a lot of research, and (...) became second nature to us.”*

Some participants stated that as the understanding of the goals and tasks of the project was clear, the communication got better. Especially at the beginning, much clarification is needed, according to the coach of project B.

The use of the second language of the company's representative in project B was not perceived as a big problem but as a barrier sometimes. One expert stated that academia is communicating more strictly. The company representative of project A saw this as a wake-up call. The participant felt that it was necessary to communicate more structured and fact-based rather than in the participant's industry. It is more important to be fast than to do it correctly.

Two experts mention that it is essential to transmit the benefit of strategic models if the students use them. SMEs are often composed of staff without an academic background. They are often not used to academic models but value them if used and presented correctly.

Some participants mentioned the importance of simplifying things. The business coach of project B learned to simplify it even more that students understand it to avoid going back and forth all the time. When projects are conducted digitally even, more simplification is needed.

Due to the covid-19 restrictions during the project, the business coach felt that the lack of understanding and the need for much clarification was especially needed because it was impossible to meet physically in one place. In the student's P6 opinion, the best meeting was the one when two students of the project were allowed to visit the company and talk to them in person:

*“(...) having those type of meetings makes the communication better, and there is less misunderstandings.”*

According to the coach of project B, to avoid misunderstandings, constant interaction and feedback rounds or anonymous online surveys could help facilitators to learn about group dynamics.

Expert P10 considered that the way of communicating gets more informal throughout the project. One expert mentioned:

*“(...) it gets more honest the longer you work together.”*

All the participants agree that it is essential to get to know each other, and if the persons do not change, there should not be a problem regarding the communication.

## 4.5 Secrecy

The participants in project A did not sign a non-disclosure agreement (NDA), and the participants in project B did. For the participants in project A, it was unclear who the owner of the result is and for the ones in project B, it was clear. The company in project A did not have to share secret information or information which could harm them. However, the students in project A got the information that parts of the project's result will be used for a future product in the pipeline. As no information regarding the new products could have been given to the students, the motivation dropped as they felt that they are not delivering something the company will use. Student P1 mentioned:

*"(...) they were like asking for a task which will not be practical in practice..."*

The second student of the project felt the same and stated that it confused them, but as soon as the company clarified what the focus was, the students understood it and accepted it.

Except for the misunderstanding in project A initially, none of the participants perceived that the SMEs were holding back necessary information. Expert P7 clearly stated that the commitment of the students must be there and that it is essential to communicate:

*"(...) I think it can be a problem if you do not regulate it properly in the beginning."*

For student P6 in project B, the NDA was clear and understandable, and the participant would not share anything as the company is perceived as the owner of the result. The same student would not think that it is straightforward for everyone:

*"(...) some people would have no problem sharing the result..."*

The participants of project A, who did not sign an NDA, would share the result if someone would ask them. The ownership of the project result was not defined, and the company representative is aware that the students could share it with everyone.

Expert P8 thinks that students do not have the necessary experience to understand secrecy agreements:

*"When you have been working for five years on a project, and you see someone talking about this by mistake in the wrong occasion (...) if you have not been in that situation, it is very hard for students to understand."*

Expert P9 mentioned as well that the individual's culture can impact the way how someone understands secrecy:

*"(...) the meaning of secrecy or confidentiality might be different depending on the country and culture."*

## 4.6 Innovation

The interviewed students did not feel that they had a massive contribution towards innovation in the company through their projects. They were aware that the results of the collaboration were connected to something innovative in the company as in both projects, the innovative development was already done. All the students were aligned in terms of their willingness to create something innovative. Student P6 stated:

*“I would like to be a part of something innovation-related again. Yeah, I think it is interesting.”*

The experts agreed that the main contribution of these projects boosts innovation in the company. Expert P9 mentioned that companies are often not aware of the importance of innovation and that these projects can help them:

*“(...) they stick to what they can, and we think that competitions in the future will be even more challenging, and they need to start innovating (...)”*

The same expert mentioned that companies need to tolerate some risk and failure and know how to handle innovation. In these collaborations, academia affects the innovation culture in the company, according to one expert.

According to one expert, the innovative nature of the projects generates uncertainty for the students, and it might not always be clear how to achieve the goals. That means iterative processes for the students and tasks might have to be repeated, leading to frustration. Increasing the feedback from the students through online surveys to learn more about the situation in the team can help the coach to guide the team better.

According to expert P10, the collaborations can be incredibly fruitful and foster innovation if the same parties work together again:

*“(...) both parts get to know each other, and synergies are found in terms of capabilities and equipment ....”*

## 4.7 The output of the projects

Sometimes the participants of the study referred to the final output of the project. Student P6 of project B was not satisfied with the result in total as too many misunderstandings and internal problems did not allow them to do their best:

*“I am not proud of what we submitted. I think we submitted a really poor result (...)”*

The coach P5 of project B, on the other hand, is satisfied with the output:

*“(...) I think the students did like really well with what they had to work with (...)”*

The coach perceived that the company could use the output for the long term. The company representative of project A was also satisfied with the result and saw the

opportunity to use it in the long term. Due to the company representatives' academic experience, it was easy to know what to expect from the collaboration and how to use the synergies that both parties will benefit from.

## 5. Analysis

The following chapter presents the analysis of the empirical findings. The analysis is divided and structured as per the found themes after coding the data. The main found traits and critical factors are discussed and exposed in this section.

### 5.1 Graphical presentation of results

Figure 5.1 shows the results of the analysis of the present study:

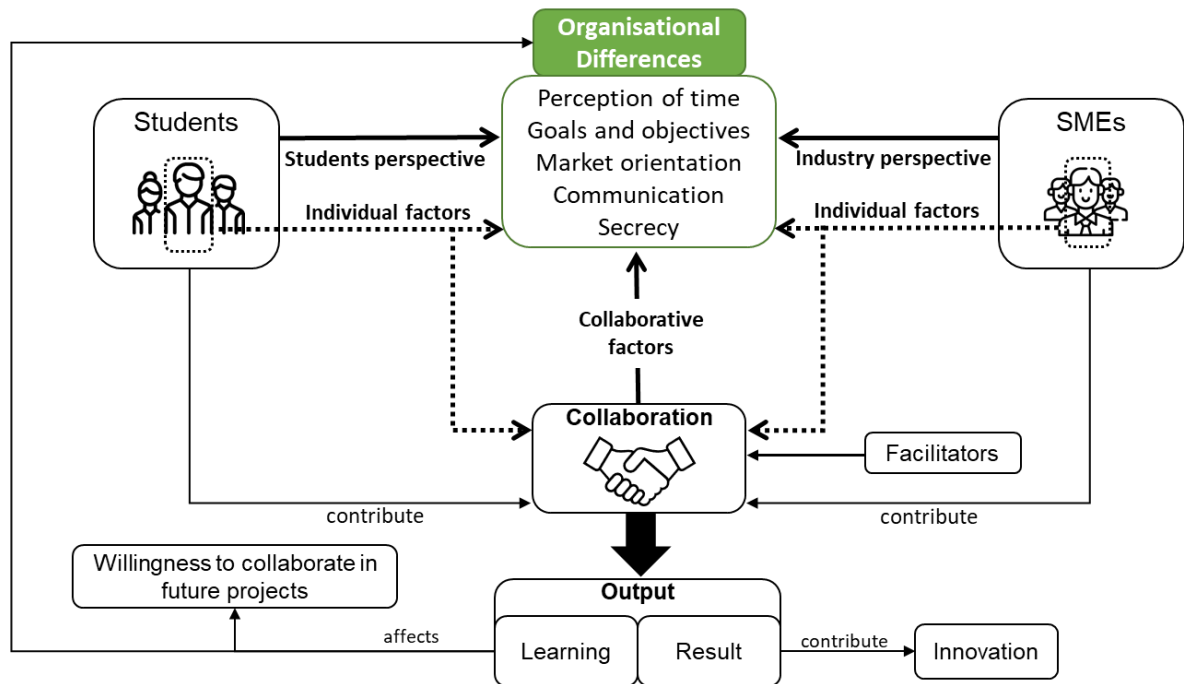


Figure 5.1: Graphical presentation of the results

As figure 5.1 shows, the following three factors have an impact on how participants in student-based UI collaborations perceive organisational differences:

- Individual factors
- Perspectives (SMEs/Student)
- Collaborative factors

The mentioned factors can either impact the organisational differences positively or negatively or create new challenges in this kind of collaboration. The factors and how they impact the perception of the organisational differences are described in the following sections. Table 5.1 summarises the factors and the related organisational difference. The way these factors are managed affect the organisational differences, the outcome of the collaborations and the participant's learning.



Table 5.1: Relation of factors and organisational differences

		Time	Goals	Market orientation	Communication	Secrecy	Innovation & Uncertainty	Learnings/ Experience
<b>Individual Factors</b>	Experience	x	x	x	x	x	x	
	Culture	x			x	x		
	Understanding	x	x	x	x	x		x
<b>Perspectives</b>	Students perspective			x			x	
	Academic Structure	x	x					
	Academic contribution				x		x	x
<b>Collaborative Factors</b>	Industry	x	x	x		x		
	Uncertainty	x	x			x	x	
	Group dynamics	x	x	x	x			x
	Communication				x			
	Secrecy					x	x	
<b>Expectations &amp; Synergies</b>			x					x
<b>Facilitator/Business Coach</b>		x	x	x	x		x	x

## 5.2 Individual aspects

The following individual aspects have an impact on the perception of the organisational differences and the generation of challenges in these collaborations:

- The individual's experience
- The individual's culture based on the nationality
- The understanding an individual has based on the experience and culture

Figure 5.2 shows the relation between the individual's experience, culture, and understanding and how these factors impact the collaboration and the organisational differences. The experience and the culture of an individual directly impact the understanding and the collaboration and the collaborative factors.

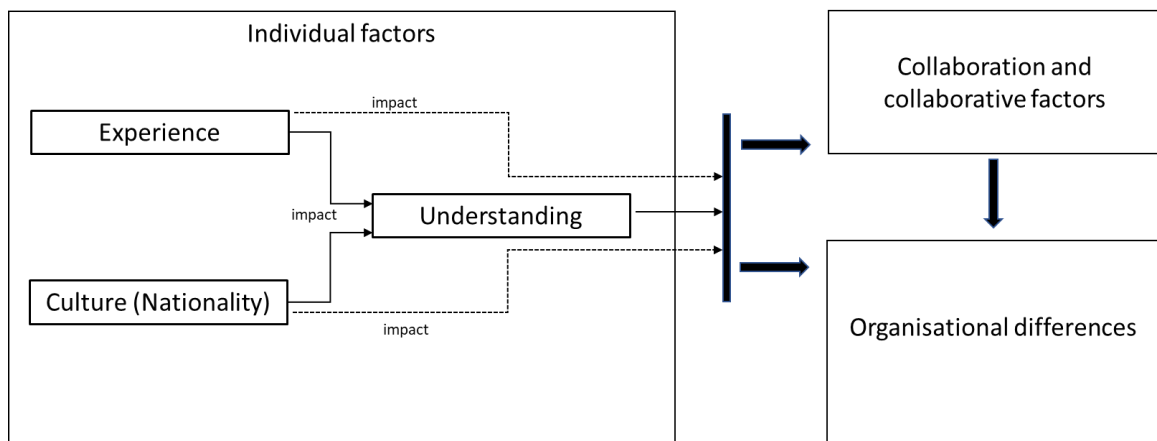


Figure 5.2: Individual factors

### 5.2.1 The individual's experience

Students' experience from their previous background and education impacts how they understand topics related to the project. The most significant differences regarding understanding in teams is the awareness of the goals and objectives of the project.

Having existing working experience is significantly impacting student's time management in these collaborations. Team members who have working experience or experience in other projects and collaborations are more aware of planning the tasks to reach the project's goals by setting deadlines. Students with working experience in the specific market where the topic of the project is positioned tend to be very oriented to the market. If the student's market orientation is higher than required from the company, it can lead to frustration and a drop in motivation. The study found that the companies with experience in this kind of collaborations are struggling less with these projects than those without experience, which is aligned with the findings of Bjerregaard (2010). They are aware of the academic and student's capabilities. The way how students understand an agreement in terms of secrecy also often depends on their previous experience. As students might have never worked on projects in a company, they do not know how crucial an NDA agreement is and do not understand it.

### 5.2.2 The individual's culture

This study discovered that several cultural aspects based on the individual's nationality impact the collaborations. Responsible persons for this kind of collaborations in terms of facilitators are aware of the risks of having students with different cultural backgrounds to collaborate with. Cultural factors impact communication if students or company representatives must use another language than their native language. How to run a project can also be different in an international team, which impacts the collaboration. In a multi-cultural team, the importance a person gives to the secrecy agreements can impact projects. The cultural aspects also impact the way how students deal with keeping the deadlines and plan their time.

### 5.2.3 The individuals understanding based on their experience and culture

As discussed before, parts of the individual's understanding are linked to the participant's previous experience and culture. The orientation towards the market and the understanding of the market and its environment is a big challenge for students without experience in that specific sector. If students understand the secrecy, it depends on one side about the existing experience and on the other side on their culture. Company representatives or facilitators, if available, must put much importance on the secrecy at the beginning of the project, even though some students do not seem to understand completely why it is so important. However, students who had to sign an NDA agreement understand in terms of secrecy that they cannot share the project results and that they are not the owner of the results.

The most exciting aspect regarding the collaborations and the individuals was the understanding of the goals. The study found that participants of student-based UI collaborations are aware of the importance of defining the goals as early as possible (Canhoto et al., 2016; Morandi, 2013). Sometimes students are not even involved in that stage. As students are often not involved in defining the goals, they do not understand

them and do not need to clarify them. With a lot of clarification and communication initially with the company representatives or facilitators, some students understand the goals. Other members often do not try as hard to understand the goals, which leads to unnecessary time spent on tasks that are not needed. Some students even tend to forget the primary goal throughout the collaboration. In some projects, the understanding and clarification of the goals, in the beginning, leads to better communication and collaboration within the team.

The present study shows that the company representatives who participate in these collaborations and understand the academic perspective benefit more from the collaboration and face fewer challenges.

### **5.3 Perspectives**

This chapter describes how the academic and the industry perspectives affect the organisational differences in collaborations when students are involved.

#### **5.3.1 Academic perspective**

##### **Students' perspective**

The student's perspective has a significant impact on the challenges emerging due to the organisational differences.

Students usually are not just participating in the collaboration and also attending other subjects in parallel. In general, the workload of these projects is perceived as “high” by them, and despite it does not affect the deadlines, it is perceived that the deepness of the work could be more significant if they would work just on the project. Understanding the market, the product, the company’s strategy, and the company's goals is much to understand for the students. To catch up with all the information is not easy for students and requires much time, especially in the initial phase. Often market research is required, and it is vital to make sure that students know what they are doing. Students are often not used to industry-related tasks, which is a challenge for them. It is not easy for a student to know more about a company doing a task that the student does not know how to develop. Even though they are struggling, it is found that students want to present something valuable, and they generally care about presenting something valuable for the company. Students usually care about the final grade at the same time. Students with work experience were creating practical material, and sometimes they were adapting to the academic structure just because of the grades. These factors are aggravated by the fact that, in some cases, a lack of interest or commitment is identified on the student’s side. In terms of innovation, the project often provides innovation to SMEs. Most of the time, students do not perceive that they are doing innovative tasks or contributing to innovation individually.

### **Academic structure**

The organisation of the project is important and impacts the deepness and the capability to add value to the company with the final output. The collaboration can be included or not within a course or a program. Including it in a program has positive effects due to the interest of the students in the grade. It was positive because students do not need to find extra time, and they just need to follow the course structure and timing. On the other hand, adapting the project to the course structure can create a challenge in terms of time limitations due to the size of the project and available time. In this study, it was observed that the goals were previously set by the university, which is good to avoid conflicts according to current literature (Canhoto et al., 2016; Morandi, 2013). This can have benefits such as avoiding using time from the course for the definitions of goals. It is positive because the academic staff knows the regular performance of students better than companies. On the other hand, setting the goals previously presents some cons, such as students struggling to understand them as they did not participate when they were created.

### **Academic contribution**

When experienced facilitators or academic staff contribute to these projects, the collaboration benefits from their experience. Academic staff, for example, learned how important it is to create balanced groups in terms of the student's background, leadership skills and interests. The second contribution of academia is using models, such as SWOT analysis (Ellis, 2011) or Porters five forces (Porter, 2008). Models are used on the academic side, but SMEs are not used to apply models. This is because sometimes SMEs are composed of professionals with non-existing academic experience. The misunderstandings of the models impact communication and are an identified challenge described by current literature (Muscio & Pozzali, 2013). SMEs like to use models if these are usable and practical. Academia tries to contribute with strategic models to provide a long-term vision. SMEs are good and focused on daily operations but lack knowledge about the customer and long-term strategy.

Finally, the main contribution of academia to these collaborations is innovation, and it is done in different ways. Through these projects, academia fosters the innovation culture in SMEs. The projects focus on very different types of innovation, from a process to a new business model. The study found that to adapt to the SME necessity is essential to be successful in these collaborations.

Kanter (2006) states that tolerance for failure and handling risk and uncertainty is essential to managing innovation. To try to manage innovation in the same way as a business is managed is a common mistake. This is something that academia try to change in these collaborations. SMEs tend to be more static organisations that avoid risks and present a low innovation tendency (Stewart et al., 1999). In these projects, academia contributes to fostering innovation in two ways. First of all, with the output of

the project, which is perceived as innovative. Second, this study found that these collaborations contribute to teaching SMEs the difference between running a business and managing innovation, affecting the SME's innovation culture. Rosenbusch (2011) stated that having an innovation orientation benefits SMEs and positively impacts the company, such as increasing the risk analysis capabilities or brand equity.

Even though the degree of innovation is not that high in the project's final output, the results of these projects are often a big step for companies. Sometimes the level of innovation seems to be low because the step related to innovation has already been done, and the students are just trying to market the product. This might be that for SMEs, the internal sources are the most critical factors to develop innovation (Laursen & Salter, 2004). Finally, it is essential to be aware of the different results of these projects depending on the background of the participants. Depending on the school participating in the collaboration, the synergies between the company and university are different.

### 5.3.2 Industry perspective

The industry's perspective significantly impacts how organisational differences and other challenges identified in this study are perceived and managed.

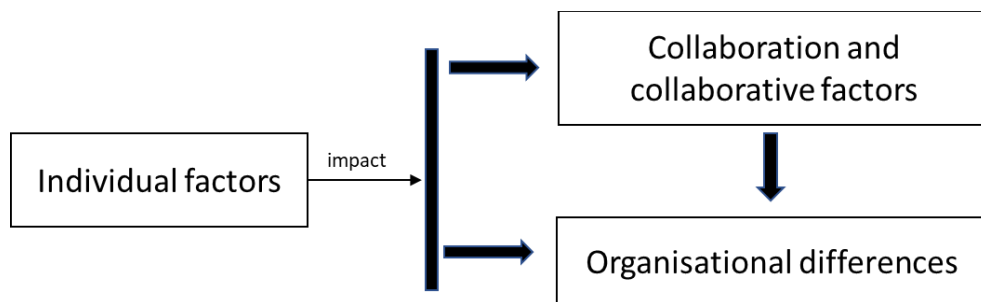
The following aspects of the industry perspective are mostly related to the orientation towards the market. The business side of the collaboration is not interested in the academic results and focuses on the project's output. The industry side is oriented towards their goals, and that is everything that counts for them. As described by Castro et al. (2005), SMEs want to compete in the market. Even though SMEs are not aware of the academic language and models used, they value their work. They want to connect the output to a valuable activity for them. The industry is aware of what they want and what they want to achieve. Companies that collaborate with students expect a payback even if they do not pay for the collaboration. The study's results also show that a facilitator helps to achieve the level of orientation towards the market the company expects. A facilitator can address the importance of caring about the customers' needs, and the market needs to secure the expected output (Ghauri & Rosendo-Rios, 2016).

A challenge in these collaborations can occur if the company wants the academic side to improve the results. This is not interesting for the academic side as for the students, the project is often tight to a course or programme. A constant pace or reminder from the industry side in terms of tasks and deadlines can help towards the overall output of the projects. Students tend to prioritise the work if they get constantly reminded, as long as the pressure is not too high. Too much pressure can cause frustration (Barnes et al., 2002). The industry is not sharing information needed by the students to achieve the goals is usually not the case in student-based projects and normally regulated with an NDA. If there was no NDA needed to sign, the company also did not have to share information with the students that could harm them. Misunderstandings in terms of time

planning and time orientation (Ghauri & Rosendo-Rios, 2016; Merchant et al., 2014) were not discovered by this study between the industry and academic perspective. A challenge in these collaborations is the lack of time on the industry side. The industry is perceived as not as agile as the academic side in the projects.

## 5.4 Collaborative factors

In this chapter, the main factors related to the collaboration between students and the company will be exposed. The chapter describes the participants' perceptions regarding the main factors of the UI collaboration and the relation between these factors and the organisational differences. Figure 5.3 shows again that the individual factors impact the collaborative factors and the organisational differences.



*Figure 5.3: Relation individual and collaborative factors*

### 5.4.1 Uncertainty in the collaboration

Sometimes minor changes have to be made regarding the main goal in the project. These changes can be caused by difficulties to get data, secrecy, or a misunderstanding of the initial goal. That changes are not critical but affect the motivation of the students. This leads to uncertainty among the students. Innovative projects involve uncertainty and iterative processes. Students are sometimes not aware of this, and repeating tasks lead to frustration. Often the teams feel lost at various points of the projects. Participants perceive that sometimes they follow the tasks given by the coaches or facilitators without seeing the overview of the project. Students are uncertain due to the lack of experience in similar tasks. As innovation is the project's nature, the initial goals are often not aligned with the final output. The degree of awareness regarding this fact directly impacts the participants' frustration and motivation when facing uncertainty. Complex and ambiguous situations can lead to uncertainty if people cannot access all the information needed or feel insecure about their level of knowledge (Brashers, 2001). Innovation decisions are highly related to uncertainty, and the inputs and outputs are not easy to predict (Hurst, 1982). The interviewed experienced facilitators described innovation as navigating through the unknown where there is no right or wrong, and it is just about moving in the right direction. This awareness when making decisions seems to be very close to the uncertainty concept described by scholars (Hurst, 1982).

#### 5.4.2 Group dynamics

Group dynamics significantly impact the project's performance in an international environment with students from diverse cultures and backgrounds. Having these heterogeneous groups makes it essential to get to know each other and understand each other. The teams often face internal problems and have fewer arguments and discussions with the company, as typical in other UI collaborations (Bertello et al., 2021). Failing with individual and internal deadlines, managing time poorly, assuming different amounts of responsibility, and not aligning in understanding the tasks and goals are the primary internal challenges perceived. On the other hand, the facilitators perceive a lack of feedback between the students and them. Facilitators and companies perceive that the groups can be very autonomous and sometimes miss asking questions about the group dynamics in the team. At the same time, the team does not share the questions or uncertain perceptions to the coach or the company because they fear failing the course or feel embarrassed. The group's motivation is also affected by not getting the necessary information for the market. The internal challenges are discouraging for individuals and affect the group dynamics.

#### 5.4.3 Communication in the collaboration

All the participants perceived that they were talking at the same level and that the communication was polite and friendly. No difference in the communication styles is observed as described, for example, by Mitton et al. (2007). However, most of the interviewed students have difficulties understanding the company's terminology, and in some cases, SMEs do not understand academic terminology, which is stated as common challenges in UI collaborations (Mitton et al., 2007; Muscio & Pozzali, 2013; Plewa et al., 2005). The most common misunderstanding is perceived when students talk about the company's specific terminology for the product or market. For students, it can take time to understand the company and market-related terminology. Even students with working experience struggle when communicating using specific terminology of the company but face more minor problems than those without working experience.

#### 5.4.4 Secrecy

Secrecy is essential and can represent a risk for the company in these projects if the information shared with the students is sensitive. Signing an NDA is the most common solution for this problem, and at the same time, the study discovered that not all student-based projects require an NDA. If an NDA is not signed, the perception of the ownership of the outcome is unclear. Students who sign an NDA perceive the company as the owner and seem to be more aware of the criticality of sharing information related to the project. Usually, innovation consists of novelty, and companies would not like competition to have access to the final output. The commitment of students in terms of secrecy is essential to develop innovative projects with SMEs. Signing the NDA has a direct effect on the student's perception of ownership and secrecy. As the students do

not have the values like researchers to share the results, they do not feel that their values are not considered as described by Bikard et al. (2019). Students accept if the company cannot share more information due to secrecy reasons if no NDA is signed. It is essential to mention that it can affect students' motivation if they cannot provide all the information.

#### 5.4.5 Expectations and synergies for the collaboration

From the company's perspective, it is essential that the expectations are realistic and aligned with the capabilities and availability of the students. Understanding these synergies between both sides in these projects helps to define the expectations for the final output. The study discovered that having a previous academic background allows company participants to adapt their expectations. They can easily understand the boundaries of this kind of projects and the structures and methods that the academic side uses. Having the academic background as a company representative might help avoid the problem that SMEs do not have the time to map the academic partner beforehand (Bertello et al., 2021) as they are aware of the academic structure.

This research focuses on collaborations with SMEs, and it is more common to find employees without an academic background in these companies. For these participants, it is necessary to explain, clarify and simplify the expectations related to the output of the project and the methods used. Often facilitators take too much for granted in terms of the student's capabilities. The expectations towards the student's understanding are high at the beginning of the project. Companies are not disappointed with the result, which leads us to conclude that their expectations are lower or more realistic. On the other hand, the students or the facilitators are not always satisfied with the result of the project. In some projects, teachers provide a previous seminar to contribute to students' expectations. This seminar could be used to prepare the students for the local culture where the project takes place. The seminar can also be used to create awareness of having different cultures in the team.

### 5.5 Result of the projects

The following chapter gives an overview of the willingness for future projects, the participants' learning, and the participant's perception of the result of the project.

#### 5.5.1 Willingness for future projects

The challenges identified in this study and the organisational differences mentioned in chapter two do not affect the participants' willingness in a negative way for future UI collaborations. Students perceive it more as a challenge and learning and want to work on more projects in collaboration with the industry. Some students are especially interested in participating in projects related to innovation to support the company towards innovative products and processes. Companies see the outputs as long-term



opportunities and value students' capabilities, leading to the willingness of future collaborations.

### 5.5.2 The output of the project

The output of the project is structured in two parts. The output in terms of the learning and the output in terms of the result:

#### **The learning of the project**

Responsible persons for UI collaborations learn from previous experience in these projects how important it is to define the goals as early as possible. There should be enough time for the students to create an understanding of the goals, as exposed earlier. One option is to set the targets not thoroughly before the students meet the company to let them participate in the final setting of the goals, which helps them understand the goals from the beginning.

Facilitators or coaches who support students throughout the collaboration learn from the projects that it is essential to simplify the goals and tasks for the students. They often overestimate the students' technical understanding and background, and simplifying helps to collaborate for both sides. As the projects analysed for this study were conducted during the covid-19 pandemic, the collaboration had to take place digitally. This led to new challenges in the collaboration as it was harder for students to understand the goals and tasks and the industry of the company. Having the meetings digitally means even more simplification from the facilitator or coaches' perspective. Another learning for this kind of facilitators or coaches in the projects is to get constant feedback from the students. Constant feedback should be collected to understand how the leadership in the group is working and how the group dynamics in general works. Some facilitators or coaches were focused on online tools to get feedback from every team member about the mentioned topics. Probing questions can help the facilitators to check if the students understood the project's concepts, tasks, and goals.

The student's learning is the focus of this kind of collaborations, and the students also perceive that the company allows them to learn new things. Company representatives want students to learn something, and they do not care what grades students get from the academic side. Students learn for the next possible collaboration to spend more time understanding the project's goals. They would also try to encourage other members to generate a better understanding of it.

#### **Result of the project**

Even though SMEs tend to not implement the project from the beginning into their long-term strategy, as identified in this study and by Bertello et al. (2021), they see the output as relevant for the long-term.

In general, the perception was that the information provided by the students was helpful, and even though it would not have an immediate impact, it is perceived to have an impact on the company in the long term.

The central perception is that the work is functional, practical, and oriented towards the needs and interest of the company. Although inconveniences are faced, students are generally satisfied, and companies value the outputs of the projects. Some students can get frustrated at the end of the project due to the massive amount of tasks. This could affect the final output of the project that could have been better, according to them.

## 6. Conclusion

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*The following chapter presents the answers to the research questions stated in chapter two based on the analysis in chapter five.*

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The present study aimed to identify how students and SMEs perceive the organisational differences in innovative UI collaborations and outlined specific characteristics of student-SME collaborations regarding the organisational differences. The research questions connected to the purpose will be answered below to fulfil the purpose:

***RQ1: How do participants of student-based UI collaborations perceive the organisational differences?***

How participants of UI collaborations perceive the organisational differences depends on the individual factors, the participants' perspectives, and collaborative factors.

The current study's findings show that the organisational differences defined in the research model are related to the ones observed in collaborations in which students are involved despite these were perceived differently. The research model is based on the general organisational differences between academia and industry. As this study focused on student-based projects and SMEs, specific challenges related to these organisational differences were identified. Therefore, these differences were not between industry and academia in a generic way but were perceived between SMEs and students in a specific way.

The way organisational differences are perceived is specific but fits in chapter two's previously defined structure. The causes are different and emerge from specific factors from SMEs and students, as identified in the analysis.

### **Perception of time**

In student-based collaborations, the study found that the different perception of time in terms of the orientation towards the past, present or future is not a problem as scholars found (Merchant et al., 2014). The students adapt to the time orientation of the project which the company is aiming for. A specific challenge regarding the perception of time is that some student groups fail internally to keep the deadlines. Another challenge is the uncertainty regarding the tasks, making it hard for students to plan the allocated time per task. In general, the timeframe for the project is usually given by the course or programme of the students. It sets the boundaries related to the time, and the time pressure can be high if the students have parallel courses. The lack of time of the industry side is seen as another barrier during the collaboration.

### **Different goals and objectives**

Having different goals to achieve between the students and the SMEs within the project was not observed, as described in the previous literature (Bertello et al., 2021; Galan-

Muros & Plewa, 2016) in student-based projects. The students were adapting to the project's goals, which were set at an early stage of the project as stated by current literature to avoid challenges and save time (Canhoto et al., 2016; Morandi, 2013). Some challenges related to the goals appeared, such as participants forgetting the project's primary goals or misunderstanding them due to a lack of working experience. The knowledge of SMEs is narrow and specific. At the same time, the student's background is usually broad and not aligned with this specific knowledge except in the case of having previous work experience in the same sector. A lack of specific knowledge from the product and market and the lack of time available and spent to understand the context of the company's goals were other challenges emerging.

### **Market orientation**

The challenge coming from the different orientation towards the market was not perceived as a challenge in student-based projects, as previous literature describes (Barnes et al., 2002; Ghauri & Rosendo-Rios, 2016; Hasche et al., 2020). Students usually adapt to the company trying to be as market-oriented and realistic as possible in student-based projects. Some specific challenges appeared. For instance, facilitators usually have to push students without working experience towards the market. A lack of experience and specific knowledge is separating the students from the market orientation of the SME. Accessing the market is essential for the company, and students try to contribute to this activity. However, sometimes the lack of previous experience in this field generates frustration and slows down the process.

### **Communication styles**

In collaborations in which students are involved, different communication styles are not a problem. The findings are aligned with the literature that an effective and open way of communicating with each other is an important aspect (McNichols, 2010). The participants do not perceive the use of their second language as a problem. Communication in student-based projects is perceived on a respectful level. A specific challenge identified in student projects is understanding the market or company-oriented terminology, which can take much time at the beginning of the project. We also identified that the communication improved as soon as the project team understands the goals. Using models is essential from the academic perspective, which can be hard to understand for the industry if not presented simply and beneficially for the company. Cultural individual factors (based on nationality) impact the perception of the organisational difference regarding how to communicate with each other.

### **Secrecy**

The organisational difference about secrecy leading to a challenge about protecting intellectual property and avoiding sharing information (Bikard et al., 2019) is not seen as a problem in student-based projects. A specific challenge in terms of secrecy in the

projects where students are involved is that due to the missing working experience, students do not understand the importance of secrecy and the importance of not sharing secret information. The individual's culture in terms of nationality can also impact how the participants deal with the secrecy in projects. SMEs not sharing information due to secrecy reasons (Bertello et al., 2021) was not identified as a problem in the current study.

***RQ2: How are the organisational differences managed when students are involved in university-industry collaborations?***

How organisational differences can be managed is identified by the applied solutions in the projects and the individual's learning. The individual aspects, the different perspectives, and the collaborative factors are relevant for perceiving the organisational differences and how organisational differences are managed.

**Applied solutions**

The academic staff and facilitators are aware of defining the goals early to avoid redefining them during the collaboration, slowing the whole process down (Canhoto et al., 2016; Morandi, 2013). To minimise the students' misunderstanding related to the goals, it is helpful to finalise the concrete goals with the students and just the basic framework without them. In order to prepare the participants, it is helpful to introduce the students to the culture and leadership style of the location where the company is if the team is international. The working experience, the culture based on nationality, and the educational background significantly impact how the organisational differences are perceived. It is crucial to select a balanced team based on these aspects. In general, students are likely to adapt to the company's situation, which makes the students manage the organisational difference and accept the structure of the SMEs. As already mentioned, different models are sometimes used by students. When using models in the collaboration, it is vital to transform the output of the used model in a way that is useful for the company. As the workload can be high for the participants, the industry or a facilitator must keep a constant pace with the students in terms of meetings or feedback sessions. The constant reminder helps to make the students prioritising the work for the specific project. To avoid an unclear situation regarding the ownership of the project's result, signing an NDA and clarifying the importance of secrecy can help create an understanding on the student's side. This study exposes the way how the interviewed participants managed organisational differences. The following shows the relation between the actions taken and the affected organisational differences.

*Table 6.1: Applied actions*

Applied actions	Impact on organisational differences				
	Time	Goals	Market orientation	Communication	Secrecy
Defining goals early		x			
Finalise the goals definition with the students	x	x			
Introduction seminar: Local culture and leadership				x	x
Balance the teams (Culture, background, work experience)	x	x	x	x	x
Use of models taught in paralel to the project		x	x	x	
Use of models in a practical way for SMEs			x		
Use of facilitator: To keep the pace of the team	x	x	x	x	
NDA is signed in some projects					x

***RQ3: How do the organisational differences affect the willingness for future collaborations?***

Organisational differences and the related challenges did not harm the willingness of the participants. Students expose that they learn much from these projects and perceive them as challenging. The willingness for future projects is high, especially when the project is related to innovation. Companies value students' contribution and are also interested in future collaborations and the student's learning.

***RQ4: How is the relation of UI collaborations between the projects and the innovation of small and medium-sized enterprises when students are involved?***

According to the present study's findings, the innovation contribution depends on the project, the company, the facilitator, and the team of students. Companies in these projects are receiving information and insights on their innovative projects. Students are working with a real case and learn how to contribute and manage innovative projects. The degree of innovation is sometimes perceived as low by the students if they are not developing the innovative part. However, students perceive that they are contributing innovatively to the company through their work. These collaborations stimulate the SMEs' innovation culture, and it affects their orientation towards innovation. The collaboration, including an experienced facilitator, presented a high impact on the innovation orientation of the company.

## 7. Discussion

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*The following chapter shows what field the current study contributes to, and we place it among the current literature. The chapter ends with suggestions for future research as well as the limitations of the study.*

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### 7.1 Contribution

This study presents three different aspects. First, the study contributes to previous literature on organisational differences in UI collaboration by specifying how these differences are perceived in collaborations between students and SMEs. Second, this study provides an overview of the main factors that can increase or decrease the organisational differences in student-SME collaborations. Third, the study collects applied actions in these projects that positively affect the organisational differences and propose other success factors that, if considered, could positively impact the organisational differences in Students-SME collaborations.

The study contributes to the understanding of how organisational differences influence student-based projects. We identified that the organisational differences between universities and industries lead to UI collaborations' main challenges (Elmuti et al., 2005; van de Vrande et al., 2009). Previous research on organisational differences in UI collaborations focused on analysing the general organisational differences between the University and the Industry (Fisher & Klein, 2003; Galan-Muros & Plewa, 2016; Ghauri & Rosendo-Rios, 2016; Muscio & Pozzali, 2013; Sjöo & Hellström, 2019). To fill the gap in the literature, this study contributes to how organisational differences are managed in UI collaborations where students are involved. This study provides insights into the occurring challenges due to the organisational differences in student-based projects and shows how these challenges can be managed.

The study's main theoretical contribution are the three factors (individual, collaborative, and perspectives) that significantly impact how the organisational differences are perceived. Depending on the factors, challenges related to the initially defined organisational differences occur in student-based projects. These challenges, coming from the organisational differences, which are impacted by the factors, are partly different from general UI collaboration challenges without students.

### 7.2 Managerial implications

In this study, a framework was developed explicitly for UI collaborations that involve students in which the goal is to foster innovation in SMEs. It is based on previous literature and includes specific factors from the defined collaborations between students and SMEs. This framework highlights some specific traits of these student-based UI collaborations that the participants perceived and impacted this kind of projects. Identifying individual and collaborative factors, the awareness of the perspectives, the

currently applied actions, and the suggested solutions contribute to improving managerial actions in innovative UI collaborations in which students are involved.

### **Learnings of the participants**

The main learnings exposed by the participants are summarised in this section. These learnings contribute to know how interviewed participants would solve the organisational differences in the future. Data shows that by applying the learned lessons of the experienced projects, organisational differences could be reduced even more in future projects. The first learning of a participant is that getting feedback about the understanding of the members related to the goals and tasks of the project can be helpful for facilitators or project responsible. Collecting anonymous feedback can provide a better overview of the students' understanding. This feedback could be related to group dynamics issues and guide the team in the right direction. If the participants from the SMEs do not have an academic background, it can be helpful to increase the awareness and prepare them for what to expect from this kind of collaborations. Simplifying the tasks and goals also helps to minimise misunderstandings in terms of goals. It is essential not to take understanding for granted, mainly if technical terminology is used. Some students might not have the necessary background in terms of education or working experience. If the projects have to be run digitally, it is even more important to simplify the goals and tasks. The participants miss a lot of valuable information and insights when they do not have the chance to meet personally. To visit the company in digital projects is very important to improve communication and understand the company's goals, as one analysed project shows. Table 6.2 shows the relation between the learnings mentioned during the interviews and the possible impact on organisational differences.

*Table 7.1: Learnings of the participants*

Learnings of the participants	Impact on organisational differences				
	Time	Goals	Market orientation	Communication	Secrecy
Increase anonymous individual feedback		x	x	x	
Work in company representatives expectations	x	x		x	
Simplify tasks and goals		x		x	
Not to take students' understanding for granted		x		x	
Digital projects: Simplify more		x	x		
Digital projects: Control the loss of information in communication		x		x	

Other important factors when managing organisational differences emerged from the analysis. However, this study aimed to understand how organisational differences are managed. This study contributes to the managerial actions currently being applied or applied in the following projects by the participants. As these factors emerged from the data analysis and not directly from the interviewed participants' opinions, these will be included in appendix 3 of the study.



### **7.3 Future research**

Due to the impact of the covid-19 pandemic in society, these collaborations were developed digitally. This impacted the projects, and even though the participants were satisfied with the results, it is considered that it impacted the project. Research on how digital formats affect the communication, understanding, output and learning of these projects would be essential to improve future collaborations in digital environments.

Individual characteristics, academic or industry perspectives and collaborative factors affect the perception of the organisational differences and create challenges in these collaborations. The projects in this study were created with students with different cultures, backgrounds and work experience. Future research in which these factors are homogenous, for example, to analyse a project in which all the students have the same background or culture, could provide more in-depth knowledge about how these factors impact the collaborations.

In this research, one of the projects included a facilitator. The role of this facilitator was basically to provide guidance and push the students towards the goals of the project. Having an experienced facilitator in the team seemed to be something positive for the collaboration due to the support provided to the students. Future research analysing the effects of having a facilitator or not could be interesting to know when a facilitator is needed or not.

Finally, future research could be carried out with the same aim as the present study but with different cases. For instance, a study could be carried out with teams that work with their native language. From the beginning and throughout the whole project, observing the teams would also get deeper insights into the perceived challenges. Analysing the same projects in the same university when the pandemic is over could be done in order to see the difference. To compare different projects from different universities to observe if the challenges are perceived in the same way would also contribute valuable insights on how to manage these collaborations.

### **7.4 Limitations of the study**

Despite the novelty and the newly created insights of this research, the study is not free of limitations. First, the analysed projects of the study were in the same university in Sweden, and the companies were as well based in Sweden. Analysing projects from different universities or even different countries could have given a more diverse view on the perception of the challenges in these collaborations. Another limitation regarding the analysed projects is that not the whole team was interviewed to collect the data for the study. The third limitation is that most of the participants in this study had to use their second language when collaborating in the project, which might have affected their perception of the organisational differences and their ability to solve them by themselves. Participants conducting the project in their native language might have had given a deeper insight into the perception of the faced challenges. The last limitation of

the study is that the projects analysed were conducted during the covid-19 pandemic, which means that they were conducted digitally. The previous literature was based on projects which were conducted physically. The pandemic situation might have impacted the perceived challenges just because everything was digitally, and the world was in an extraordinary situation. Even though these limitations are given, we do not think that these limitations impacted the trustworthiness of our results.

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## 9. Appendices

### Appendix 1: Interview Guide

#### Topic 1: Background and Project

- Background questions
  - Where are you from?
  - What is your working experience?
  - Can you tell us more about your education?
  - What are you studying?

#### Topic 2: About the Project

- About the Project:
  - What was the project about?
  - How was the project organised?
    - In Terms of Participants from university and Industry and did you have a coach/facilitator or not?
  - What was the duration of the project?
  - What was your role in the project?
  - Did you distribute different roles in the project team?
  - How many collaborative projects did you do? Your experience in UI-Collaborations?

#### Topic 3: Challenges due to the different cultures of the two Organisations

Short introduction by the Interviewers about the upcoming questions!

- 3.1 Perception of time
- 3.2 Different goals and objectives
- 3.3 Market orientation
- 3.4. Communication styles
- 3.5 Secrecy

The questions in bold are the open question in which the participants answered if the organisational difference was perceived in their projects in the case of the project members or the expert's experience. The following questions are just questions for us, which we asked if the respondents did not mention anything like that in the first question.

#### **3.1 Perception of time**

- Short Introduction of the challenge by the Interviewers

Main question:

- **Did you perceive that your perception of time was different from the perception of time from the industry part of the collaboration?**

Sub-Question:

- Did you keep your deadlines as a team?
- Did members of your team fail to be on time in terms of deadlines?
- Did you set your own deadlines?
- Did you have to change deadlines during the project?
  - a. If yes, how did it affect the project?
- Did the company representatives keep the deadlines?
- Did the company representatives ask you to change the deadlines?
  - a. If yes, how did it affect the project?
- Did you improve in terms of timing and time planning throughout the project?

If this organisational difference led to a challenge in your project, did it affect:

- The Goal of the project
- Your Learning of the project
- The overall performance during the project
- Your willingness to participate in future projects

and if yes, how?

### 3.2 Different goals and objectives

- Short Introduction of the challenge by the Interviewers

Main questions:

- **Did you perceive that your perception of the goals/objectives was different from the perception of the goals/objectives of the company?**

Sub-questions:

- Did this gap of the perception of the different goals/objectives change during the project?
- Were the goals well defined at the beginning of the project?
- Did you have to change the goals of the project during the collaboration?
  - If yes, in what phase of the project did you change the goals and why?
- When were the goals defined in the project?
- Was it hard to define the goals at the beginning of the project?
  - Was it easy to define the goals inside your team?
  - Was it easy to define the goals with the company?

If this organisational difference led to a challenge in your project, did it affect:

1. The Goal of the project

2. Your Learning of the project
3. The overall performance during the project
4. Your willingness to participate in future projects

and if yes, how?

### **3.3 Market orientation**

- Short Introduction of the challenge by the Interviewers

Main question:

- **Did you perceive that your perception of the market orientation was different from the perception of the company's market orientation?**

Sub-questions:

- Was your project connected to a profitable activity for the company that needed to be solved or improved?
  - If yes, was the time pressure high?
- Did you care about delivering something valuable and profitable for the company as a team?
  - If yes, do you feel that all the members of the team cared about that?
- Was it essential for you to do enough research or have enough knowledge about something before deciding or giving a solution to the company?
  - If yes, did this slow you down?
- Was your orientation towards the market?
  - If yes, did someone push you to have this orientation?
  - If no, what is the reason for that?

If this organisational difference led to a challenge in your project, did it affect:

- The Goal of the project
- Your Learning of the project
- The overall performance during the project
- Your willingness to participate in future projects

and if yes, how?

### **3.4 Communication styles**

- Short Introduction of the challenge by the Interviewers

Main question:

- **Did you perceive that the communication in terms of using different languages/terminology/or styles of the team was different from the company's languages/terminology/or styles?**

Sub-questions:

- Was it always understand what the company tried to transmit to you regarding language/terminology/or communication styles?
- Did the communication style change during the project?
- Did you have to clarify yourself often?
- Did they have to clarify themselves often?

If this organisational difference led to a challenge in your project, did it affect and if yes, how?

- The Goal of the project
- Your Learning of the project
- The overall performance during the project
- Your willingness to participate in future projects

### 3.5 Secrecy

- Short Introduction of the challenge by the Interviewers

Main question:

- **Did you perceive that the perception of secrecy was different from the one from the company?**

Sub-questions:

- Do you feel that you are the owner of the work?
- Did you feel that the company was holding back information from you?
- Did you sign a confidential agreement at the beginning of the project?
- Is it critically for you to share information regarding the project? Example: Showing the results to another company?
- Are you afraid that the students use confidential information about your company? (just for comp. representatives)

If this organisational difference led to a challenge in your project, did it affect:

- The Goal of the project
- Your Learning of the project
- The overall performance during the project
- Your willingness to participate in future projects

and if yes, how?

#### **Perceived Challenges by participant:**

- 3.1: Time (YES/NO)
- 3.2: Goals (YES/NO)
- 3.3: Market orientation (YES/NO)
- 3.4: Communication (YES/NO)
- 3.5: Secrecy (YES/NO)

How was the overall impact of the challenges during the collaboration?

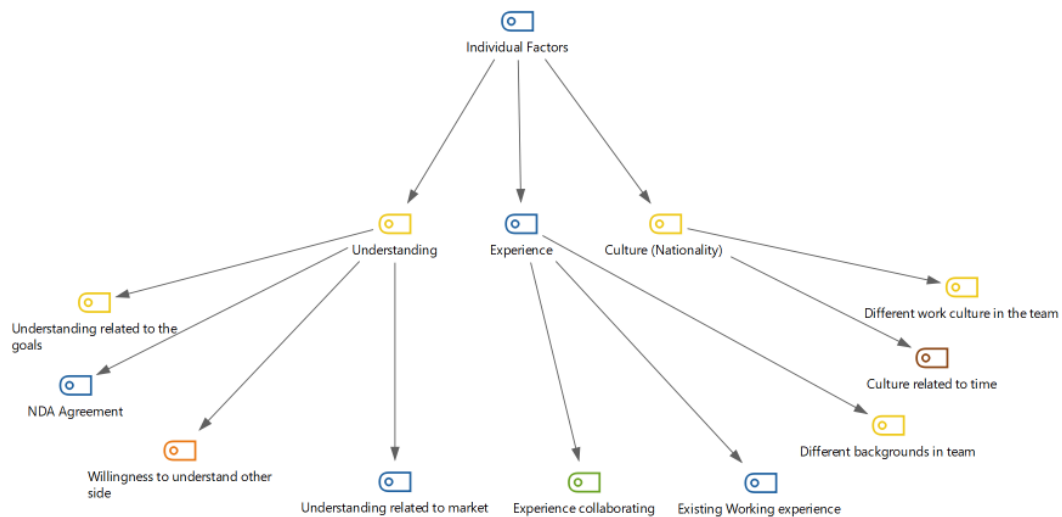
- The Goal of the project
  - Your Learning of the project
  - The overall performance during the project
  - Your willingness to participate in future projects
- 
- How was the evolution of the perceived challenges during the project?
  - What is the learning outcome of the project in terms of organisational differences?
  - How did this learning outcome affect your willingness towards future collaborations?

**Relation to innovation:**

Can you explain the connection of the project(s) and innovation in the SME?

**Appendix 2: Code levels**

**Hierarchical Code-Subcodes Model**



*Figure 9.1: Hierarchical subcode model - individual factors*

# Hierarchical Code-Subcodes Model

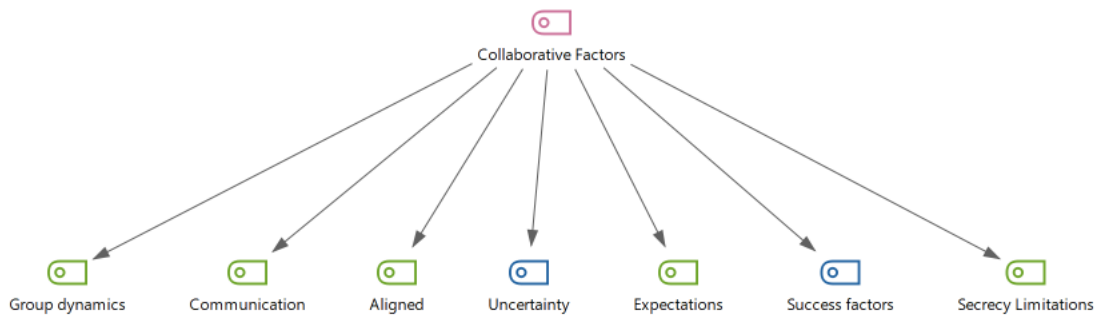


Figure 9.2: Hierarchical subcode model - collaborative factors

# Hierarchical Code-Subcodes Model

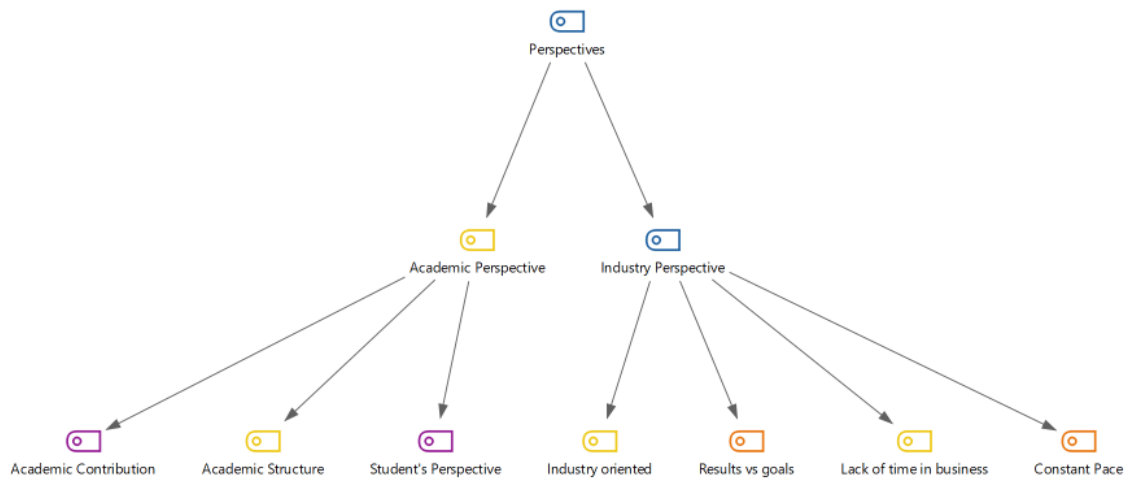


Figure 9.3: Hierarchical subcode model - perspectives



# Hierarchical Code-Subcodes Model

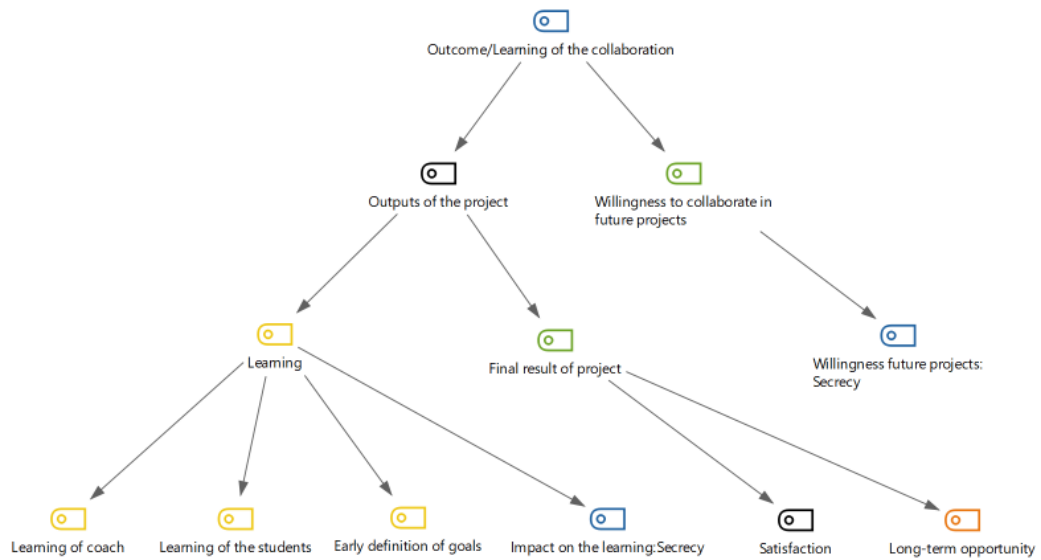


Figure 9.4: Hierarchical subcode model - learning of the collaboration

## Appendix 3: Other managerial aspects emerged from the data

Table 9.1: Other managerial aspects emerged from the data

	Impact on organisational differences				
	Time	Goals	Market orientation	Communication	Secrecy
Provide visits to the company		x	x	x	
Signing an NDA					x
To take specific work experience in account		x	x	x	
Track the understanding of the goal: Students forget it		x	x		
Collaborations benefit from experienced facilitators	x	x	x	x	
Provide awareness regarding iterative nature of innovative projects	x	x		x	
Clarify terminology				x	
Increase student's participation in goals definition		x			
Intensify/stress communication Student-SME at the beginning		x		x	
Simplify high amount of information for students	x			x	