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Abstract
<p>University-industry collaboration is an important source of knowledge and innovation in industry. However, academia and business often experience challenges when collaborating. To ensure continued and valuable collaborations it is important that firms and university-partners manage the collaborative challenges arising during the collaboration process. Through a longitudinal case-study of 14 firms in a Norwegian research center, this study aims to gain insights into how firms use different strategies to address collaborative challenges. The study identifies two groups of firms that experience two specific collaborative challenges related to goal dissimilarities and timeframe dissimilarities. By using active accepting strategies firms manage to mitigate the challenges related to goal dissimilarities. Furthermore, the use of passive accepting strategies contributes to manage challenges related to timeframe dissimilarities. However, firms using active defensive strategies experience that the collaborative challenges are still present and continues to affect the collaboration process. The findings have implications for how firms manage UIC, and how to strengthen the relationship between firm and university partners when collaborating to enhance knowledge and innovation development.</p>

Dealing with collaborative partners: How firms use different strategies to manage challenges in a university-industry research center

1 Abstract

University-industry collaboration is an important source of knowledge and innovation in industry. However, academia and business often experience challenges when collaborating. To ensure continued and valuable collaborations it is important that firms and university-partners manage the collaborative challenges arising during the collaboration process. Through a longitudinal case-study of 14 firms in a Norwegian research center, this study aims to gain insights into how firms use different strategies to address collaborative challenges. The study identifies two groups of firms that experience two specific collaborative challenges related to goal dissimilarities and timeframe dissimilarities. By using active accepting strategies firms manage to mitigate the challenges related to goal dissimilarities. Furthermore, the use of passive accepting strategies contributes to manage challenges related to timeframe dissimilarities. However, firms using active defensive strategies experience that the collaborative challenges are still present and continues to affect the collaboration process. The findings have implications for how firms manage UIC, and how to strengthen the relationship between firm and university partners when collaborating to enhance knowledge and innovation development.

Keywords: University-industry collaboration, Collaborative challenges, Firm strategies

1. Introduction

Innovations are vital for the survival of firms, and a critical source for competitive advantage in an ever changing environment (Crossan and Apaydin, 2010, Eveleens, 2018). The innovation literature has emphasized the importance of external knowledge sources to help firms with innovation development (Chesbrough, 2003, Chesbrough et al., 2006, Chesbrough, 2012). An important knowledge source to attain technical expertise, new knowledge, and contributions to the development of innovations, are universities and research organizations (henceforth universities) (Cohen et al., 2002, Laursen and Salter, 2004, Galán - Muros and Plewa, 2016). This is evident in by the growing trend of establishing university-industry collaborations, such as R&D alliances, and joint research centers (Boardman and Gray, 2010). While there are evidence that joint research collaboration yield positive firm outcomes (Perkmann et al., 2013, Vega-Jurado et al., 2017), there is frequent rappers that joint research collaborations do not guarantee positive outcomes for the partners involved (Thune and Gulbrandsen, 2014), and that joint collaborations are frequently influenced by collaborative challenges and organizational barriers between university and firm partners (Ambos et al., 2008, Bruneel et al., 2010, de Wit-de Vries et al., 2018).

The collaborative challenges are often related to the dissimilarities between the partners, such as different timeframes and resource allocations, management styles, goal diversity and cognitive differences (Harrison and Klein, 2007, Galán - Muros and Plewa, 2016, Ghauri and Rosendo-Rios, 2016, de Wit-de Vries et al., 2018). To manage the collaborative challenges, prior literature have found that firm and university partners may employ various strategies. Oliver (1991) proposed that firms can use defensive strategies, to make sure that the collaboration moves forward, which firms' employ to protect their own interests when collaborating with external partners with different interests. Defensive strategies may contribute to mitigate collaborative challenges by engaging in persuading activities towards the external partners. Furthermore, the firm and university partners may use accepting strategies which can mitigate collaborative challenges by bridging the interests of the different partners in a collaboration (van Fenema and Loebbecke, 2014).

However, while prior literature have established that the firms' use of different strategies may contribute to mitigating collaborative challenges (Smith and Lewis, 2011, Ahmadsimab and Chowdhury, 2019), the literature does not specify the precise collaborative challenges that the firms and university partners experience (de Wit-de Vries et al., 2018). There has also been paid little attention to how these challenges develop during the collaboration process in

university industry research centers (Estrada et al., 2016). Furthermore, prior literature has also to a large degree overlooked firm' strategies within a university-industry collaboration (UIC) context, and *how* the firms' use of various strategies affects the collaborative challenges during a collaboration process (Bjerregaard, 2010, Estrada et al., 2016). Hence, this study aims to answer the call to improve the understanding of how firms manages collaborative challenges (de Wit-de Vries et al., 2018) by exploring the following research questions: "*How do firms' manage the goal and timeframe dissimilarities when collaborating with university partners to develop innovations in a research center?*"

The research question is addressed through a qualitative longitudinal case study of 14 firms in a Norwegian Research Center to get in-depth insights into the firm' strategies, and the challenges they experienced. The research center makes a good context when studying firms' strategies to manage collaborative challenges, because research centers include both firms and university partners, that are known for having different institutional logics (Perkmann et al., 2018), while they also are supposed to bridge these dissimilarities through innovation development and novel research production (Styhre and Lind, 2010). To explore how different firm' strategies affected the collaborative challenges, the selected firms in this case, came from different industries, different in sizes and with various involvement levels.

The findings make three key contributions to the UIC literature. First, this study contributes to the UIC literature by identifying three strategies firms employ to manage the collaborative challenges that arises in these collaborations. The firms employ *active defensive strategies*, *active accepting strategies*, and *passive accepting strategies* to ensure that the collaboration will lead to progress. In addition, the study found that in the beginning of the research center, highly involved firms used active defensive strategies to manage the collaboration process, while less involved firms employed both active and passive accepting strategies. During the collaboration process, some of the highly involved firms changed their strategies from active accepting strategies, and passive accepting strategies. Moreover, it seems that to mitigate the collaborative challenges related to goal and time dissimilarities, firms need to use active and passive accepting strategies towards the university partners. The findings indicate that to mitigate the collaborative challenge related to goal dissimilarities, the firms should use an active accepting strategy. To mitigate the challenges related to timeframes, the findings indicate that the firms should use a rather passive accepting strategy. Firms' that used active defensive strategies during the collaboration process on both goal and timeframe relate challenges, did not experience that the challenges got reduced, but rather began affecting the collaboration. Hence, the overall findings show that to mitigate challenges related to goal and time

dissimilarities, firms should to a larger degree rely on accepting strategies, rather than defensive strategies.

Second, this study contributes with new insights into the collaborative challenges the firms' experienced during the collaboration process, by specifically distinguishing between the challenges such as goal dissimilarities and timeframe dissimilarities (de Wit-de Vries et al., 2018)

Third, the longitudinal study in the UIC context contributes with new insights to the underlying collaborative dynamics within a research center. The study contributes with insights into how firms can manage different collaborative challenges during the collaboration process through the firms' use of different strategies, which is a less researched area (de Wit-de Vries et al., 2018).

The paper is structured as follows: Section 2 highlights the theoretical framework for this study, Section 3 outlines the methodical approach, Section 4 presents the findings, Section 5 contains the discussion and propositions, and Section 6 presents the concluding remarks, implications and limitations of the study.

2. Theoretical framework

2.1. University-industry collaboration and collaborative challenges

University-industry collaborations have been understood as a valuable tool to enhance firms innovativeness and knowledge developments (Dess and Shaw, 2001). By collaborating with universities, firms are able to attain sources of novel knowledge, new resources and technologies (Perkmann et al., 2013, Vega-Jurado et al., 2017). While there are various ways to facilitate for university-industry collaborations (Perkmann and Walsh, 2007), one key way is through formalized collaborative research partnerships such as university-industry research centers (henceforth research centers) (Ponomariov and Boardman, 2010, Scandura, 2016).

Research centers can often contribute to innovative outcomes in firms (Perkmann and Walsh, 2007, Perkmann et al., 2013, Vega-Jurado et al., 2017). However, the collaboration between firms and university partners can also be challenging (Segarra-Blasco and Arauzo-Carod, 2008), and can hinder positive outcomes for the partners involved (Thune and Gulbrandsen, 2014). The struggles with attaining positive outcomes, can be traced back to the firms and university partners challenges when collaborating. These challenges are often rooted in the dissimilarities between the partners (Estrada et al., 2016, Præst Knudsen et al., 2019), and the partners dissimilarities related to goals (Bjerregaard, 2010, Sauermann and Stephan, 2013) and timeframes (Perkmann et al., 2011).

Prior studies have found firms often have goals related to financial results (Sauermann and Stephan, 2013), solving present firm problems and ensuring advantages over the market place (Roth and Magee, 2002). In collaboration with universities, firms often have goals related to technology and innovation developments (Lam, 2011, Canhoto et al., 2016) or specific knowledge development which can contribute to the firms innovativeness (Gilsing et al., 2011). Thus, in collaboration with universities, firms often want to control and coordinate the university partners towards research and technology development which suits the firms' needs (Aghion et al., 2008)

University partners however, often aim to develop high quality research which can contribute to the public knowledge domain (Perkmann et al., 2018) and that multiple firms and industries can benefit from (Canhoto et al., 2016). While some university partners also have goals which are more related towards innovation developments and applied research (Tijssen, 2018), the university partners often want to have academic freedom, and chose for themselves what to focus in regards to projects and research (Sauermann and Stephan, 2013).

While the firms and university partners often have different goals (Sauermann and Stephan, 2013), they also operate based on different timeframes (Perkmann et al., 2011).

Prior studies have found that firms often expect results in relatively short to medium timeframes (Perkmann et al., 2011). Butler and Newman (1989) found that firms usual timeframes are more or less constant, also when dealing with changes or new situations. Hence, because firms often experience short "time-to market", the firms need collaborative partners who can facilitate for fast decision-making processes, and fast results (De Maeijer et al., 2018). Furthermore, firms often have a short-term timeframe related to R&D activities and expect results and deadlines in a relative short timeframe (Plewa et al., 2005). University partners on the other hand, often aim for long-term research and work within longer timeframes (Perkmann et al., 2011), which can be seen in normative timeframes for PhD-projects and academic grants (Plewa et al., 2005). Furthermore, university partners often seek out activities which are more long-term in nature (Kronlid and Baraldi, 2020). As such, the university partners often experience challenges related to the firms timeframes, and may struggle to achieve results within short timeframes (Plewa et al., 2005, Kronlid and Baraldi, 2020).

Because the firms and university partners often have different goals and operate within different timeframes (Canhoto et al., 2016, Kronlid and Baraldi, 2020), the dissimilarities may results in collaborative challenges (Friedland and Alford, 1991, Estrada et al., 2016), and disrupt the achievement of valuable outcomes (Lai and Lu, 2016).

While a lot of prior literature often refers to goal and timeframe dissimilarities as ‘cultural differences’ (de Wit-de Vries et al., 2018), little attention has been paid to the specific challenges related to timeframes and goals, how these challenges develop during the collaboration process (Estrada et al., 2016), and how firms manage the university partners dissimilarities during the collaboration process (Bjerregaard, 2010, de Wit-de Vries et al., 2018). Hence, this study aims to explore how the firms manage the dissimilarities with university partners and how the firms’ management affect these challenges, when firms and university partners collaborate to develop innovations.

2.2. Management and strategies in collaborations

Since collaborative challenges can evolve into conflicts, the management of the collaborative challenges can be related to conflict management. Thus, to understand how firms manage collaborative challenges with university partners, I draw upon the conflict management literature (Thomas, 1992) and strategic response literature (Oliver, 1991).

One of the main conflict management frameworks developed by Thomas and Kilmann (1974) suggests that firms had five options when managing conflicts. These options were based on five management styles: *collaboration*, *competition*, *compromise* and *avoidance* and *accommodation*. These management styles are well-established in both organizational (Kuhn and Poole, 2000) and network literature (Welch and Wilkinson, 2005). Strategic response literature have often been used to explain firms’ actions when engaging with partners that impose different institutional logics (Friedland and Alford, 1991) and different cultures (Ghauri and Rosendo-Rios, 2016), both in inter- and intraorganizational contexts (Oliver, 1991, Pache and Santos, 2010, Ahmadsimab and Chowdhury, 2019). The strategic response framework have also been drawn upon in previous UIC literature, when studying the management of dissimilarities in research center collaborations (Estrada et al., 2016). Oliver (1991) suggested that when firms engage with partners that have different institutional logics (Friedland and Alford, 1991) and different cultures (Ghauri and Rosendo-Rios, 2016), the firms can use five different strategic responses to manage the dissimilarities between partners. These five strategic responses include: acquiescence, compromise, avoidance, defiance, and manipulation.

Since conflict management is directly related to management of challenges (Tidström, 2014) and strategic responses are related to the management of dissimilarities between partners (Estrada et al., 2016) these streams of literature can contribute to when studying the how firms’ manage the collaborative challenges related to timeframes and goals in collaborations with university partners.

The strategic response concept can be understood as strategies firms employ to manage internal and external collaborations between partners with different institutional logics (Bjerregaard, 2010, Ahmadsimab and Chowdhury, 2019). The strategic response literature often separates between two types of strategies when dealing collaborative challenges: strategies that are in a larger degree protecting the firms' own logics (defensive strategies), and strategies that in a larger degree tries to bridge the different institutional logics (accepting strategies) (van Fenema and Loebbecke, 2014) (See Table 2 for an overview).

Oliver (1991) proposed avoidance, defiance and manipulation responses as strategies to protect the firms' own logics. *Avoidance* regards the organizational attempts to prevent the necessity of conformity. *Defiance* involves a more active response towards the institutional processes and involves active resistance. Lastly, *manipulation* can be understood as the most active response, and involve purposeful attempts to persuade the other institutional component (Oliver, 1991). While acquiesce and compromise responses where in a larger degree related to bridging or engaging with the partners institutional logics. *Acquiesce* involves acceding to the institutional pressure. *Compromise* involves balancing the expectations and bargaining with the conflicting institutional demands (Pache and Santos, 2010). Hence, firms use different strategies to manage the challenges that arises in collaborations between partners. While defensive strategies are more concerned with protecting the firms' own interests and working towards achieving the firms' own goals, firms' who employ accepting strategies focus in a larger degree on bridging the interests of the partners involved (van Fenema and Loebbecke, 2014).

Furthermore, Smith and Lewis (2011) found that the use of strategies can vary during the collaboration process, and that firms' may use different strategies during different times to pay attention to different challenges that arises. Hence, they proposed that during a collaboration process, firms may accept that there are collaborative challenges related to specific dissimilarities between partners, but instead of engaging with a specific challenge, they rather focus on resolving other challenges which they understand as more important (Smith and Lewis, 2011). Hence, to manage collaborative challenges, firms may use strategies to protect their own interests and logics during the collaboration process, while also using strategies that focus to a larger degree on acceptance, and accepting that there are multiple logics and multiple interests within the collaboration, and work towards bridging the different logics (Poole and Van de Ven, 1989, Smith and Lewis, 2011, van Fenema and Loebbecke, 2014). In addition, van Fenema and Loebbecke (2014) found that the defensive and accepting strategies may be more or less

passive. While some defensive strategies are in a larger degree active, where firms engage in specific actions to maintain the focus on their own firms.

Accepting strategies, such as acquiesce strategies are more passive in nature, where the firms' are more passively involved in collaborative activities and in a larger degree follow the partners interests, while firms' that employ compromise strategies are more actively engaged in the collaborative activities to bridge the different interests, goals, and working practices (van Fenema and Loebbecke, 2014). Luo et al. (2008) studied the strategic responses to firms in interorganizational collaborations, and found that firms' usually employ defensive strategies when the firms are in a position of power, and may bargain they resources to attain the firms objects while firms who experience that the external partner can contribute with complementary resources to attain the firms objective, often employs strategies related to accepting and adapting. Liu et al. (2017) found that firms often engage in strategies that protect the firms interests when firms collaborate with partners that have little in common, such as different cultures, and institutional logics.

Furthermore, Ahmadsimab and Chowdhury (2019) found that to mitigate the dissimilarities between institutional logics between firms and public organizations, the firms must employ strategies that balances the interests of the partners to bridge the dissimilarities between the partners, and achieve successful and efficient collaborations. Bjerregaard (2010) studied the collaboration process between firms and universities and found that firms use both short-term and long-term strategies during the collaboration process. Short-term strategies are to a large degree related to defensive strategies, by protecting the firms interests by focusing on the attainment of fast R&D results. Where long-term strategies can be understood as accepting strategies, where the firms and university partners in a larger degree work within the practices of longer timeframes. Lastly, Canhoto et al. (2016) contributed to the literature, by explaining that successful collaborations often require highly committed partners, with comparable and complementary skills. Hence, Canhoto et al. (2016) indicates that firms must use active strategies when collaborating with university partners.

In this study I build upon these lines of research and explain firm strategies as defensive and accepting (Poole and Van de Ven, 1989, Oliver, 1991, Smith and Lewis, 2011, Ahmadsimab and Chowdhury, 2019).

Table 2: Summarized strategic responses and strategies to manage external pressure and challenges:

	Defensive strategies (van Fenema and Loebbecke, 2014)	Accepting strategies (van Fenema and Loebbecke, 2014)
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Active	<p><i>Defying</i> – Ignoring the norms, contesting the rules, active resistance towards bridging activities (Oliver, 1991)</p> <p><i>Manipulation</i> – dominating processes, persuade the external partners towards the firms’ needs, establishing power and dominance (Oliver, 1991, Smith and Lewis, 2011)</p>	<p><i>Compromise</i> – attempts to balance and bargain with external partner, blending the boundaries, bridging activities (Oliver, 1991, Smith and Lewis, 2011, Ahmadsimab and Chowdhury, 2019)</p>
Passive	<p><i>Avoidance</i> – loosening the attachments, dethatching from the activities from the external partner (Oliver, 1991, van Fenema and Loebbecke, 2014)</p>	<p><i>Acquiesce</i> – acceding to institutional pressure, incorporating norms and requirements from external partners, complying to external partners (Oliver, 1991, Ahmadsimab and Chowdhury, 2019)</p>

In summary, the collaboration process between firms and university partners may be influenced by challenges which are related to the dissimilarities between firms and university partners, and their different institutional logics. To mitigate these challenges firms’ employ different strategies when engaging with university partners. Through a longitudinal case study with different firms in a research center, this study draws upon the strategic response literature (Oliver, 1991) and aims to contribute with knowledge on how firms manages challenges by employing various strategies.

3. Data and methodology

3.1. Research design

To address the research question of how firms can use strategies to manage challenges when collaborating to develop innovations, qualitative research was deemed appropriate because it offers a more in-depth insight into the firms’ collaborative processes (Cunningham et al., 2017). Furthermore, I used a longitudinal case study (Eisenhardt, 1989, Yin, 2014) to contribute to theory development of how these strategies contribute to managing the collaborative challenges. An embedded case-study design was conducted to better illuminate how firms’ strategies affects the collaboration within a research center (Baxter and Jack, 2008, Yin, 2014).

3.2. Case selection

The case of one research center and its partners was selected because of unique access to data and theoretical relevance for contributing to the UIC-literature regarding the collaboration process between firms- and university partners within a research center (de Wit-de Vries et al., 2018). The research center is a part of a Norwegian scheme called Centers for Environment-friendly Energy Research (CEER) and have a duration of eight years. The CEER aims to contribute to long-term, world-class research and innovation developments that can contribute to value creations for Norwegian firms. The CEERs receive up to 50 % of it’s funding from the

Research Council of Norway, during an eight-year period, while firms and university partners contributes with 25% each. During the 2016, eight research centers within the CEER scheme were established, and they all focus on different aspects of environment-friendly solutions, such as: hydropower technology, biobased fuels, solar cell technology, zero-emission energy systems, smart cities, and efficient energy. The focus of this study is on one of the CEERs that was established in 2016, and that aims to contribute to increase energy efficiency in Norwegian firms. The research center has set two overall goals: to reduce energy consumption by 20-30% and reducing the greenhouse gas emissions by 10%, by focusing on technologies and firm processes that have potential for large energy reductions.

The research center has approx. 40 partners including about 25 firm partners from various industries, such as large process industry, petroleum industry, food industry, manufacturing industry, and infrastructure industry.

The embedded units (firms) of this study were based on a combination of theoretical sampling and maximum variation sampling (Creswell and Poth, 2017). The units included large and small firms from different industries, with different involvement levels within the research center (Steinmo, 2015). The variation, both in industry, size and involvement level are important because these characteristics can affect the dynamics of a research center (Ghauri and Rosendo-Rios, 2016). The final sample of the embedded units comprises of 14 firms, which I believe can contribute with an overview of the firms' collaborative processes within the research center. Table 3 gives an overview of the firms' size, industry and the degree of their involvement in the research center.

Table 3: The firm characteristics and the firms' level of involvement

Firms	Industry	Size	Level of involvement	Quote related to the firms' involvement
1	Large process industry	Large	High level of involvement The firm have several people involved in the research center activities	<i>«There are multiple people involved, but at the moment they are involved by getting information, and they are supporting me in relation to me doing a god job, and I communicate their wishes»</i>
2	Large process industry	Large	High level of involvement The firm have multiple people involved towards the research center	<i>“We are a number of people that are active in the research center]”</i>
3	Food industry	Large	High level of involvement The firm have engaged consultants and other employees to contribute within the research center	<i>«In the beginning it was me and another guy who sat and worked with this (...)but we have also another who has worked with [the research center]. We have also one more who have been pretty involved in the processes.»</i>

4	Large process industry	Large	High level of involvement	«We are trying to involve a larger group of experts from the firm”.
			The firm has engaged multiple employees that contributes towards the research center	
5	Petroleum industry	Large	High level of involvement	«There are various levels of involvement. When we work with project, a lot of us are involved, but day to day, it’s me and another one”
			The firm usually have two people following the activities within the research center, but uses a lot of employees towards the activities within the research center	
6	Food industry	Large	High level of involvement	It is a hired project manager, part-time project managers and coordinators”
			The firm have involved project managers and coordinators who work towards the research center	
7	Infrastructure industry	Medium	High level of involvement	«We are about five people [including the subcontractor] who are engaged”
			The firm have engaged a subcontractor and multiple employees to contribute to the research center activities	
8	Petroleum industry	Large	Low level of involvement	«In terms of resources, it’s only one person following up [the research center], in addition to me, who works with the administrative part. He doesn’t work with this 100 %”
			The firm have two people involved	
9	Infrastructure industry	Small	Low involvement	«Basically, it I who use time and participate in various meetings and forums [within the research center]”
			The firm only have one person involved towards the research center	
10	Manufacturing industry	Small	Low levels of involvement	«It is mainly me [who works towards the research center]
			The firm uses only one person towards the research center	
11	Manufacturing industry	Large	Low levels of human resources	“One of our hardest constrains are when participating in these projects, is more resources. Human resources. We have very little time, and we

			The firm don't have enough people to follow up the activities within the research center	<i>need to make the best of the time that we have with the resources we have available.</i>
12	Food industry	Large	Low levels of involvement The firm has mainly one person following the activities within the research center	<i>«My challenge is basically to get internal resources to be involved with me in the work [in the research center]»</i>
13	Large process industry	Medium	Low involvement: The firm don't have time or people to be very involved in the research center	<i>«It has been quite a challenge to use time and resources to follow up [the research center], while not using time on things that are not relevant»</i>
14	Large process industry	Medium	Low levels of human resources The firm don't have time or people to follow up the activities within the research center	<i>«We are a pretty small staff, and we have a lot of other things to do»</i>

(The EU's categories for firm sizes are used: large > 250, medium <250, small <50, and micro <10 employees.)

3.3. Data collection

To get in-depth information about the firms' strategies, and how they managed collaborative challenges, the primary data came from semi-structured interviews with firm- and university partners (Eisenhardt, 1989). The first interviews were collected early in 2017, not long after the research center was officially operational. This mainly to understand how the firm and university partners operated in the beginning of the research center; to capture the informants view of how the firms understood the collaboration in the research center, and how they engaged with the university partners to establish projects that could bring value to the firms. The interviews were conducted face-to-face and lasted approx. one hour. To capture possible changes in how firm partners adapted their micro strategies, the second round of interviews were conducted in autumn 2018. Due to geographical distances, most of the interviews with the firms were conducted over the phone, while some of the interviews with the university partners were conducted face-to face. These interviews lasted for about one hour and focused on what the firms had done during the first year of the research center, and the firm partners perception of how they understood the research center and the university partners.

Furthermore, since this study aimed to understand the firms' strategies and the adaption of their micro strategies during the collaboration process, a third round of interviews were conducted during spring/summer 2019. These interviews were mainly conducted face-to-face and were focused towards the development of the collaboration process, the collaborative challenges, and the possible changes in firms' strategies when they had collaborated with the university partners for a while. All the interviews from 2017, 2018, and 2019, were recorded and transcribed shortly after they were finished (Yin, 2014). While retrospective data have some limitations (Miller et al., 1997), the application of method triangulation was used, to prevent biases as much as possible. The primary data were supplemented with observations of annual meetings and workshops and center data (Denzin and Lincoln, 1994, Denzin, 2012, Yin, 2014)..

The observations of workshops and annual meetings contributed with increasing the knowledge about how the research center operates, and the collaborative process of the firms and university partners, based on discussions and presentations related to the collaborative project developments in the research center. Furthermore, to obtain information and insight into collaborative process between the firms and university partners from the beginning of the research center and during the collaboration process, documents that detailed the original CEER-application, firm participation, firm projects, and even some notes from the meetings between the firm and university partners, were included in this study. These secondary data sources increased the knowledge base about the research center, and simultaneously validated and complemented the information from the interviews (Yin, 2014, Creswell and Poth, 2017). The primary and secondary data are the basis for the analysis and this study (see Table 3).

In summary, the primary data constitutes of 14 firm partners, five university partners who managed various research teams, and five university partners that worked on specific projects with the firms. The university partners contributed with information about the collaborative challenges they experienced, and corroborated and complemented the information from the firm partners. Hence, the final sample consist of 14 firms, 10 university partners, one Research Center manager, and multiple documents (see Table 4)

Table 4: Overview of data sources during the research center collaboration process

	2017	2018/2019
Interviews with primary sources		
Center manager	1	1
Research area managers	5	5
Firms representative	8	14
Firm members involved		5
Researchers in projects		5
Sum of interviews:	14	30
Secondary sources	CEER application, participation lists, project documents, newsletters observations	Annual progress rappers, participation lists, newsletters, fieldnotes, project documents, observations, participation in meetings

The various data sources made it possible to obtain a more comprehensive understanding of the collaboration process, with a focus on the firms practices and strategies, and clarified information from the interviews because of the participation lists and documents that could be traced back to a timeline and provide evidence from when certain situations occurred.

3.4. Data analysis

The analysis began with an inductive within-case analysis (Eisenhardt, 1989), to obtain an overview of the data and become familiar with the information presented. The within case-analysis contributed to becoming familiar with the firms' understanding of the collaborative challenges and the collaboration process. The within-case analysis presented some descriptive findings that were relevant to the subsequent analysis. The next step was inspired by a cross-case comparison with the purpose of discovering cross-case patterns when searching for theoretical dimensions within the analysis (Eisenhardt, 1989). Through the analysis, I searched for critical firm characteristics and situations that influences how the firms' responded on the collaborative challenges within the research center. First, I mapped the collaborative challenges that influenced the firm and university partners in the beginning of the research center. Second, following Perkmann et al. (2011), I made a distinction between the challenges based on the firms and university partners different institutional logics; academic logic and commercial logic, since these logics could influence how the firm and university partners experienced the challenges. Third, I followed the challenges during the collaboration process, and focused on how the firms responded and tried to manage these challenges during the collaboration process.

During this process, I read and reread the transcribed data, to find similarities and dissimilarities among the firm partners, that could explain how the firms employed various strategies to manage collaborative challenges. When the analysis was done, I developed propositions that can be quantitatively tested in the future (Yin, 2014).

4. Findings

First, I present findings related to the challenges the firms experienced in the beginning of the collaboration. Second, I present how firms responded to those challenges, during two phases, the establishment of the research center, and during the collaboration process.

4.1. Collaborative challenges related to goal and timeframe dissimilarities

The firms that entered the research center, were differently involved from the beginning of the research center. Some firms (1-7) were highly involved and had multiple employees from the firm engaged in the activities in the research center. While other firms (8-14) were less involved and had only one or two people who engaged with the university partners in the research center (see Table 3 for overview). However, despite that the firms were differently involved, all the firms' and university partners experienced collaborative challenges from the beginning of the research center. Collaborations with dissimilar partner are often affected by collaborative challenges (Lai and Lu, 2016). The findings in this study illustrates that the collaboration between dissimilar partners can be challenging: *"The challenge is always the same, the interests are different, and you need to agree upon the product. That the firm gets as good or as bad products as all the others"* (Firm 4). The firm partners experienced specifically two collaborative challenges in the beginning and during the collaboration process in the research center. These challenges were related to the dissimilarities between firm and university partners goals, and the dissimilarity between the firm and university partners timeframes.

1.1.1 Challenges related to goal dissimilarities:

During the beginning of the research center, the firms, regardless of their involvement, experienced challenges related to goal dissimilarities between the partners (see Table 4).

At the research centers' beginning, the firm and university partners within the research center had some goals of what they wanted to achieve. The firm partners' goals were related to firm specific technological development and innovations, as stated by a firm partner: *"What we would like to see in general terms is that we [the research center and the firm] will look into new technologies and bring dem up to a level where we [the firm] are able to bring them into the market"* (Firm 11). The university partners, however, wanted to use the research center to develop new and novel knowledge and do long-term research, as one of the university partners

stated: “[In the research center] we can think a bit new, and come up with new ideas, and have some space to do that [research], which we don’t have the opportunity to do in other projects” (University partner 6).

1.1.2 Challenges related to timeframes:

The findings also show that the firms and university partners experienced dissimilarities and collaborative challenges related to the different timeframes that the firms and university partners practiced. The researchers operated with a longer timeframe, and often experienced challenges when firms operated with very short time frames, as the university partner illustrated with an example from a prior project: “We were often contacted on short notice, the firm did not define what they wanted, and that makes it very chaotic for us. It did not give us enough time or space to develop a thorough concept” (University partner 9). In contrast, the firms experienced challenges related to the university partners long timeframes, because they did not always see the need to prolong a process, as illustrated by a firm representative: “How long will you sit and file with a sandpaper? Some things are already good enough for us [the firm]” (Firm 5). Hence, the dissimilarities between the firm and university partners caused collaborative challenges in the research center from the beginning (Estrada et al., 2016).

Table 4 about here

4.2. How firms manage the collaborative challenges during the establishment of the research center, and during the collaboration process

The findings indicate that the firms employed different strategies to manage the collaborative challenges related to goal and timeframes. While some firms to a larger degree used active defensive strategies, other firms used accepting strategies to manage the collaborative challenges. The findings also show that the firms employed different strategies towards different challenges. Hence, the findings will be presented related to how the firms reacted to the different collaborative challenges.

During the establishment of the research center, when the highly involved firms (1-7) experienced goal-related challenges, they began actively pursuing the research center manager, and through him attempted to persuade the university partners to attain to the firms’ goals, while simultaneously attempted to prevent changing their own goals toward the university partners, as one of the firm partners stated: “We have to push pretty hard if we want to get heard, if you

know what I mean. We have to put in a lot of our own resources, if we want to make changes in the research center” (Firm 2), the firm representative elaborated *«We use a lot of energy on promoting our things, and we have taken it all the way up to the top [center manager]»* (Firm 2).

In addition, after internally deciding on relevant projects some of the highly involved firms focused on persuading the university partners to focus on the firms’ interests, as one of the firms illustrated: *“We prioritized what we thought is important, and we made a plan to try to influence the right people to get the activities approved”* (Firm 7).

When the firms who were less involved (firm 8-11) experienced collaborative challenges related to the goal dissimilarities between the firm and university partners, they tried actively to find compromises by suggesting projects the firms thought could be interesting enough for the university partners, as stated by a firm partner: *“We suggest projects. If they [the projects] are relevant enough, and have a high level of research, then the researchers decide that they are interested to look closer on the project”* (Firm 10).

Furthermore, some of the less involved firms (12-14) who experienced challenges related to goal dissimilarities employed a more passive accepting strategy, where they in a larger degree kept track on the activities in the research partners, but did not actively engage in bridging activities or trying to persuade the university partners to focus on the firms’ need and interests, as stated by the firm partner: *“We are involved in order to develop ourselves and keep track on the ideas or technologies [that comes out of the research center] that we can use internally”* (Firm 14). This passive accepting strategy was noticed by the university partners who were engaged in the research center: *“They [the firms] contribute with money to be a part [of the research center] and don’t miss out on anything”* (Researcher 10).

Related to the timeframe challenges, the highly involved firms (1-7) continued to engage with the research center, by putting pressure on the university partners to engage in a larger degree with the timeframes the firms practiced, as stated by one of the firm partners: *“I was a bit hard towards the research center manager. Related to the researchers, and that they must work faster on planning what our money goes to”* (Firm 4).

The less involved firms (8-14) on the other hand, employed in a larger degree an active accepting strategy when dealing with the timeframe challenges. The firm partners adjusted in a larger degree towards the university partners, by suggesting projects they wanted to work with, while simultaneously did not push the university partners to get the project started, and accepted that projects would take time, as one of the firm partners illustrated: *“We have suggested some*

ideas, but the university partners gave us some feedback that projects would be considered next year” (Firm 8).

4.3. How firms’ uses strategies to manage the challenges during the collaboration process

The firms that experienced an enhancement of collaborative challenges related to goal dissimilarities during the collaboration process (Firms 1-3), continued to use active defensive strategies towards the university partners to make sure that the university partners attended to firm goals. They did so by engaging the research center manager, and making sure that the research manager made sure that the university partners focused on the firms’ interests, as stated by one of the firm partners: *“We have tried to influence the activities and the focus on our firms by going all the way to the top” (Firm 2).* Furthermore, the firms actively tried to protect their main goals, by not aligning towards the university partners activities, as stated by a firm partner: *“The researchers have worked on a project [that is relevant for the firm], and that was OK, but I miss that they work on what we wanted them to work with” (Firm 1).*

The highly involved firms (4-7) who experienced a reduction of the collaborative challenges related to goal dissimilarities employed active accepting strategies during the collaborations. They did so by engaging in negotiations with the university partners and trying to find a compromise between what the firm partners wanted, and what the university partners wanted to achieve. During the collaboration process they focused on aligning the project, while also making sure that their interests did not disappear completely, as stated by one of the firm partners: *“We discussed a bit back and forth in relation to the practical viability and some of the researchers project suggestions [the researchers presented]. They mainly want to look at the most optimal solution, and our job was to reality check them” (Firm 6).*

The less involved firms (8-11) also experienced less challenges related to goal dissimilarities during the collaboration, also employed active accepting strategies towards the university partners. They did so by trying to find projects that were related to the firms’ goals, but also relevant for the university partners goals. Hence, they tried to find projects which both the firm partners and the university partners found beneficial. One of the firm partners explained how they did this: *“The research areas in the research center, are related in a large degree to our field, so we are involved by suggesting reasonable projects, and to discuss some problem areas that we want to work with, or that we are already working on” (Firm 9).*

The less involved firms (11-14) also experienced that the challenges related to different goals were reduced, however, they employed in a larger degree passive accepting strategies, by complying towards the university partners working practice and university partners goals, The

firm partners were in a large degree passive towards the university partners, and got attention on their goals when the university partners chose to focus on the firms. As one of the firm partners explained: *The researchers have been involved, and pulled us into activities and projects, so it have been very good for us*” (Firm 12). Hence, the firms did not actively try to attain some focus on their goals within the research center, but rather became engaged when the university partners pulled them into projects.

The collaborative challenges related to different timeframes were also managed differently by the various firms. The highly involved firms (1-3) continued using active defensive strategies, by involving the research center manager to make sure that research center progresses based on the firm partners timeframes, as stated by one of the firm partners: *“I invited them [the research center manager and university partners] to a meeting, they came and wanted to discuss, and to make sure that there will be progress. But I’m not sure, related to one of the projects we want, that we still haven’t gotten. It doesn’t seem that they understand the seriousness here”* (Firm 1). Hence, the firms (1-3) still experienced challenges related to different timeframes and employed active defensive strategies by trying actively to make the research center pursue the firms’ interests, within the firms’ timeframes.

While some of the highly involved firms (4-7) employed a more passive accepting strategy towards the timeframe challenge. The firms’ adjusted towards the university partners timeframes, and focused on a larger degree on finding mutual projects, rather than doing it within the firms’ own timeframe, as stated by one of the firm partners: *“We have discussed back and forth with the researcher, trying to find something where we can contribute, where we can have a project. Because, that’s the important thing, that we have a shared project”* (Firm 4).

The less involved firms (8-11) continued to use active accepting strategy to make sure that the challenges related to timeframes did not disrupt the collaboration process. They did so by continuing to engage with the university partners in their own pace but were open to the university partners practices. As one of the firm partners stated, *“We think that as long as nobody say stop, then we won’t do it either”*(Firm 9) The firm partner elaborated: *“I am very happy with the attention we have gotten, and the projects that have been done for us. It has exceeded our expectations. We just have to continue with giving the university partners good project ideas to work with”* (Firm 9). Hence, the firm partners kept doing what they were doing, and did not experience that the timeframe were a challenge during the collaboration process. Lastly, some of the less involved firms (12-14) also experienced that the timeframe challenges did not affect the collaboration process. These firms continued to have a passive accepting

strategy during the collaboration process and continued to rely on the university partners timeframes and engagement related to the activities within the research center, as stated by one firm: *“I feel that we are pretty well informed by the university partners”* (Firm 14).

5. Discussion

In this section, I will discuss the key findings related to how the firms managed the collaborative challenges related to goal and time frame dissimilarities during the establishment of the research center, and during the first collaborative year.

5.1. How firms’ experience collaborative challenges when engaging in a research center

This study found a clear distinction between the involvement level of the firms engaged in the research center. Some of the firms (1-7) were highly involved in the research center, and had multiple employees engaged in the activities in the research center, while some of the firms (8-14) were less involved in the research center, with only one or two people engaging in the research center activities. Contrary to prior literature (Steinmo, 2015), all the firms in this study experienced challenges related to the collaboration process. Furthermore, in contrast to prior studies (Estrada et al., 2016), all the firms experienced challenges as soon as they became involved in the research center. The challenges the firm partners experienced were related to goal (Gagné, 2018) and timeframe (Lhuillery and Pfister, 2009, Perkmann et al., 2011) dissimilarities. The differences between the firms and university partners institutional logics often are one of the reasons the firms and university partners experience challenges. (Lai and Lu, 2016). This study builds upon that understanding and shows that the firms and university partners goal dissimilarities are related to commercial science logic, and academic logics. Where the firms in this study wanted to achieve innovations and technologies (Perkmann et al., 2018) by participating in the research center. The university partners wanted to build knowledge and make novel research (Bruneel et al., 2010). Hence, the differences in the institutional logics and the dissimilarities between the firm and university partners created collaborative challenges for the firm partners (Bruneel et al., 2010). Furthermore, the findings in this study indicate that the timeframe dissimilarities also are related to the firms and university partners institutional logics, since the firms are short-term oriented, with short timeframes, and university partners are more long-term oriented, and operate with longer timeframes (Bjerregaard, 2010, Ghauri and Rosendo-Rios, 2016).

Following Estrada et al. (2016), this study shows that the collaborative challenges related to goal and timeframe dissimilarities evolve during the collaboration, and the study finds that

some of the highly involved firms (1-3) experienced that the goal and timeframe dissimilarities continued to affect the collaboration during the collaboration process in the research center, while some of the highly involved firms (4-7), and the less involved firms (8-14) experienced that the challenges related to dissimilar timeframes and goals became reduced during the collaboration process.

5.2. How firms use different strategies to manage collaborative challenges during the establishment of the research center.

When the firms in this study experienced collaborative challenges in the beginning of the research center, the firms employed different strategies to manage the challenges (Oliver, 1991, Ahmadsimab and Chowdhury, 2019). The firms that were highly involved in the research center (Firm 1-7) from the beginning, actively pursued the research center manager, and leveraged their resources within the research center in discussions with the research center, to attain focus on their goals and making sure that the university partners adjusted towards the firms' timeframes. I explain these actions by drawing from the strategic response literature (Oliver, 1991), and suggest that the demanding and actively pursuing activities the highly involved firms engaged in, where active defensive strategies, where the firms' tried to protect their own interests and collaborative routines (Pache and Santos, 2010, van Fenema and Loebbecke, 2014).

Furthermore, the analysis showed that the less involved firms (8-14) employed different strategies to manage the collaborative challenges related to the goal and time dissimilarities. To manage the challenge related to the goal dissimilarities, some of the less involved firms (8-11) were actively involved in finding compromises between the firms' goals and the university partners' goal, by suggesting project that may be relevant for the university partners. As found by Ahmadsimab and Chowdhury (2019) the firms (8-11) were in larger degree focusing on trying to bridge the different institutional logics (van Fenema and Loebbecke, 2014) between the university partners and the firms. Following van Fenema and Loebbecke (2014), I explain this behavior as an active accepting strategy. Moreover, some of the less involved firms (12-14), did not engage actively with the university partners to make sure that the university partners attained to the firms' goals. Hence, as found by van Fenema and Loebbecke (2014) I explain the firms behavior through passive accepting strategies since the firms' did not actively try to influence the collaboration and attain focus on the firms' goals.

Lastly, the analysis showed that all the less involved firms (8-14) employed passive accepting strategies when dealing with the challenges related to the dissimilar timeframes. As found by Smith and Lewis (2011), firms may use different strategies towards different

challenges based on their understanding of importance. Hence, this study indicates that some of the less involved firms (8-11) understood the collaborative challenge related to goals as more important in the beginning of the research center. Based on this, I propose the following:

Proposition 1: Firms that from the beginning are highly involved in the research center activities are more likely to use active defensive strategies, compared to less involved firms

Proposition 2: Firms that from the beginning are less involved in the research center activities are more likely to use accepting strategies, compared to highly involved firms.

5.3. How firms' different strategies affect the collaborative challenges during the collaboration process.

During the collaboration process some of the highly involved firms (1-3) continued to employ active defensive strategies to manage the collaborative challenges related to goal and timeframe dissimilarities. Prior UIC-literature suggests that to deal with challenges related to goals and timeframes, firms must engage in strategies that adjusts the university and firm partners goals (Estrada et al., 2016) I argue that by employing active defensive strategies, the firms do not bridge the dissimilarities related to goals and timeframes, which may hamper the collaboration between the firms and the university partners (Bruneel et al., 2010).

Furthermore, some of the highly involved firms (Firms 4-7) changed their strategies during the collaboration process (Smith and Lewis, 2011). Instead of using active defensive strategies, the firms began to use an active accepting strategy to manage the goal related collaboration challenge. By using an active accepting strategy, the firms focused on bridging the different institutional logics and the dissimilarities (Ahmadsimab and Chowdhury, 2019) by finding mutual projects, that could be beneficial for both the firms and the university partners. Hence, by using an active accepting strategy, the firms managed to mitigate the collaborative challenge related to the goal dissimilarities (Estrada et al., 2016). To manage the collaborative challenge related to the timeframes, the firms (4-7) employed a more passive accepting strategy (Oliver, 1991). The employment of the passive accepting strategy the collaborative challenge became mitigated. Following (Bjerregaard, 2010), I suggest that by employing an passive accepting strategy the firms' adjusted towards the university partners longer timeframes, which mitigated the collaborative challenge.

During the collaboration process, the analysis also showed that the less involved firms (8-11) did not change their strategies and continued to have an active accepting strategy towards the goal dissimilarities, and passive accepting strategy towards the timeframe dissimilarities (Ahmadsimab and Chowdhury, 2019) While some of the less involved firms (12-14) continued

to employ passive accepting strategies towards the collaborative challenges, which mitigated collaborative challenges (Ahmadsimab and Chowdhury, 2019). Thus, I suggest the following:

Proposition 3: Firms that use active accepting strategies when dealing with challenges related to goal dissimilarities are more likely to mitigate the collaborative challenge during the collaboration process compared to firms that employ active defensive strategies.

Proposition 4: Firms that use passive and active accepting strategies when dealing with challenges related to timeframe dissimilarities, are more likely to mitigate the collaborative challenge during the collaboration process, compared to firms that employ active defensive strategies

Proposition 5: Firms that use active defensive strategies when dealing with challenges related to goal dissimilarities and timeframe dissimilarities, are more likely to hamper the collaboration, compared to firms that employ accepting strategies

5.4. How firm strategies affect the collaborative challenges in a research center:

While prior UIC literature have in a large degree used cultural differences as an overall term when describing the basis of collaborative challenges (Bjerregaard, 2010, Galán - Muros and Plewa, 2016, Ghauri and Rosendo-Rios, 2016, de Wit-de Vries et al., 2018), This study found that the firms' differentiates between two specific collaborative challenges which are rooted in the different institutional logics that firms and university partners have, especially the goal timeframe dissimilarities between the firms and university partners. Thus, this study extends on previous findings within the UIC literature by highlighting that the firms must manage multiple collaborative challenges related to the dissimilarities during the collaboration process (Estrada et al., 2016).

As illustrated in Figure 1, I found that highly involved firms used active defensive strategies (van Fenema and Loebbecke, 2014) in the beginning of the research center (Proposition 1), to make sure that the research center and the university partners would attain to the firms' interests and goals (Oliveira and Lumineau, 2017), while less involved firms used accepting strategies to ensure that their interests where attained to (Proposition 2).

Furthermore, the findings indicated that to mitigate challenges related to goal dissimilarities, the firms used different strategies. This study showed that to mitigate the collaborative challenges related to goal dissimilarities firms should use active accepting strategies (Proposition 3). To mitigate the challenges related to timeframe dissimilarities firms should use active or passive accepting strategies (Proposition 4). Lastly, this study indicates that the firms that used active defensive strategies did not manage to mitigate the collaborative

challenges related to goal and timeframe dissimilarities (Proposition 5). Thus, this study suggests that by using accepting strategies, firms focus in a larger degree on bridging the firms and university partners interests (van Fenema and Loebbecke, 2014) and manages to a larger degree to engage in a two-way collaboration process (Lauvås and Steinmo, 2019), which acts as an enabler for mitigating the collaborative challenges in research centers. While firms that use active defensive strategies, focus to a larger degree on protecting the firms’ own interests (van Fenema and Loebbecke, 2014), and struggles with engaging in a two-way collaboration process (Lauvås and Steinmo, 2019), which acts as a barrier for mitigating the collaborative challenges. Based on this discussion, I suggest the following:

Proposition 6: Firms that use active strategies when dealing with collaborative challenges, are more likely to mitigate the challenges, compared to firms that employ active defensive strategies

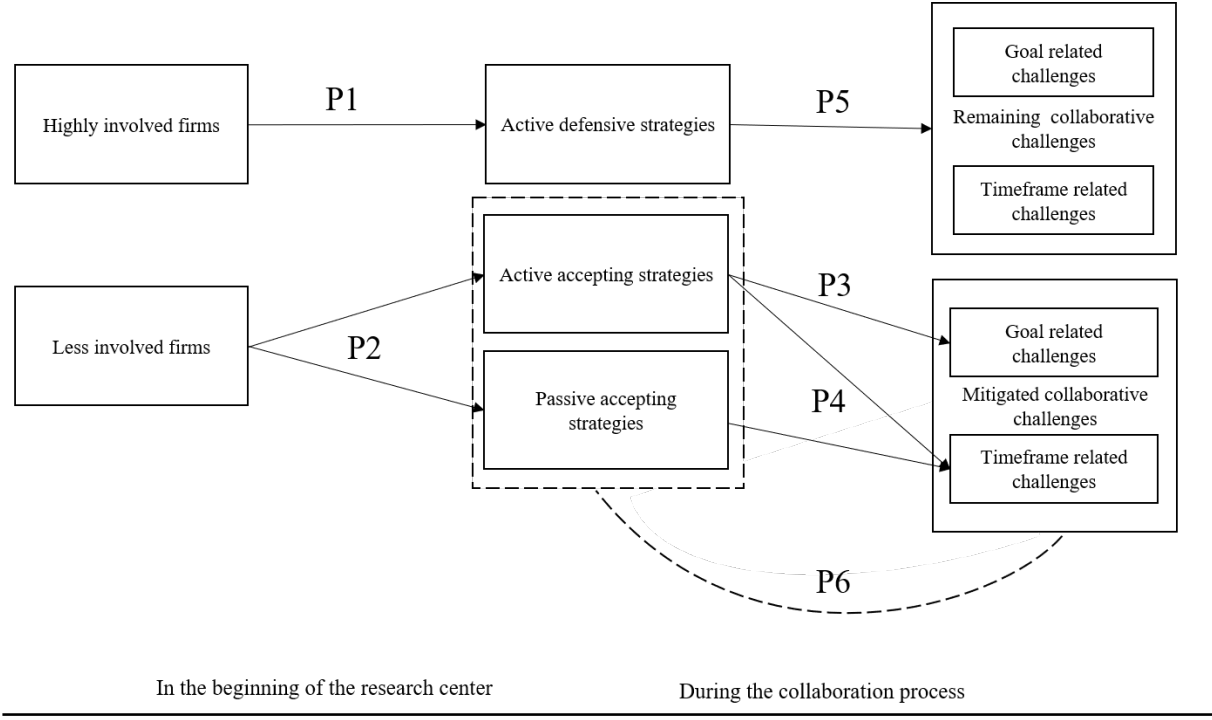


Figure 1: How firms’ strategies affect the collaborative challenges in a research center

6. Conclusion and implication

By following 14 firms from the beginning of a research center, and during the collaboration process, this study has explored how firms’ have employed various strategies to try to manage the collaborative challenges that arises when dissimilar partners engage in collaborations.

Due to the fundamentally challenging landscape when collaborating with dissimilar partners (Bruneel et al., 2010), this study proposes that firms' strategies are important for mitigating the different collaborative challenges between firm and university partners, to produce novel research and develop innovations in research centers (Gulbrandsen et al., 2015, Lauvås and Steinmo, 2019). By illustrating the firms' strategies when dealing with the collaborative challenges, this study shows how firm strategies can contribute to mitigating the challenges over time (Estrada et al., 2016).

The most notable finding relates to the understanding that firms' actions and strategies towards the university partners and research center, can mitigate collaborative challenges. While previous studies often focus on firms' and universities internal attributes when explaining how to mitigate collaborative challenges (Cohen et al., 2002, D'Este et al., 2011, Davids and Frenken, 2018), this study extends the UIC literature by focusing specifically on how firms behave in the beginning of a research center and in during the collaboration process, and how their actions and strategies affect the collaborative challenges (Bjerregaard, 2010, Estrada et al., 2016). By drawing on the institutional logics' literature (Friedland and Alford, 1991), this study contributed to the UIC-literature by outlining how the dissimilarities between firms and university partners bring specific goal and timeframe related challenges to the research center. These challenges firms must manage to enable a productive collaboration process. Lastly, by drawing upon the strategic response literature (Oliver, 1991, van Fenema and Loebbecke, 2014), this study contributes to the UIC literature, by outlining the different strategies the firms use to manage the collaborative challenges related to goal and timeframe dissimilarities (van Fenema and Loebbecke, 2014, Estrada et al., 2016). I explored how highly involved firms employed active defensive strategies and accepting strategies to mitigate the challenges, while less involved firms employed active and passive accepting strategies to mitigate the challenges in the research center. As such, this study demonstrates the importance of employing accepting strategies that enables bridging of the partners dissimilarities and two-way collaboration process.

6.1. Implications, limitations, and future research

The findings in this study have important implications for the firm and university partners engaging in research centers, when the partners aim to develop innovations and novel research, and for policy makers who contribute with funding for these types of research centers. This study suggests that to achieve effective collaborations and mitigate collaborative challenges, firms who engage in the research center should employ active accepting strategies when dealing with challenges related to goal dissimilarities. Moreover, this study suggests that using passive

accepting strategies to manage the collaboration challenge related to timeframe dissimilarities, contributes to achieve effective collaborations and mitigates the challenge. In addition, the study indicates that use of active defensive strategies to manage the collaborative challenges hamper the collaboration process and does not mitigate the collaborative challenges. Hence, these findings imply that involvement for the sake of involvement, do not guarantee effective collaboration, and that firms should use strategies focusing on bridging the dissimilarities between the firm and university partners (Estrada et al., 2016). As such, this study demonstrates that collaborations between firms and university partners need different strategies depending on the collaborative challenges the firms' and university partners experience.

Appendix:

Table 4: Illustrative quotes related to the dissimilarities and tensions firms and university-partners in the beginning of the research center

	Firms	University partners
Goals	All the firms within the research center pursue goals related to firm specific technology development	All the university partners pursue goals related to knowledge development and generic research that multiple firms can benefit from
Illustrative quotes related to the firms and universities goals in the research center	<p><i>“There are two research areas [in the research center] where I expect innovations”</i> (Firm partner 1)</p> <p><i>“We hope and expect that we get some results that can contribute to reach the internal goals the firm has developed. Within this [the results] we expect that there will be some new technology that can contribute to renewing our factories”</i> (Firm partner 12)</p> <p><i>“[We want] new technological solutions, basically”</i> (Firm partner 14)</p>	<p><i>“For researchers within this theme, the research center contributes with continuity and a base, where we can develop knowledge, hire people, and educate people. We can develop knowledge that is relevant for the whole world”</i> (Research center manager)</p> <p><i>“We are interested in getting some research results, e.g. comparisons of concepts, and getting results that are transferable to other industries and processes”.</i> (Research partner 7)</p> <p><i>We need to learn something from it [the research]”</i> (Research partner 7)</p>
Collaborative challenges related to goals	The firm partners are concerned about the focus of the researchers, mainly that the researchers will do research that are not relevant for the firms:	The university-partners experience tensions related to the work the researchers want to do
Illustrative quote about tensions related to goal dissimilarities	<p><i>«The research center can’t just work with things that are interesting for the researchers that are participating, it has to be interesting for us too.”</i> (Firm 5)</p> <p><i>«I can’t picture that the theoretical contributions [from the research center] can in any way be good enough for us to make any decisions”</i> (Firm partner 9)</p>	<p><i>“We are doing research, so there will always be challenges”</i> (Research partner 1)</p> <p><i>“I had hoped that the firm partners would want to research the long-term things, which they struggle to solve themselves”</i> (Researcher 5).</p>

Timeframes	The firms operate with a shorter timeframe than the researchers	The university partners operate with a longer timeframe than the firms
Illustrative quotes related to the partners timeframe dissimilarities	<p><i>“When we contact someone, and try to establish a project, no matter in which area, then we need the clarifications today, things go pretty fast, and not everybody manages to keep up”</i> (Firm 3)</p>	<p><i>“I hope that we get to work on solutions that can’t be realized right now, because there has to be a bit future-orientation in what we do”</i> (Research Center Manager)</p> <p><i>“Now we have the possibility to have large visions, and not just stress with ‘this must be solved for the firm partner today’”</i> (Research partner 2)</p>
Collaborative challenges related to timeframes	The firm partners experience tensions related to the researchers’ timeframes:	The research partners experience tensions related to their own and the firms’ timeframes:
Illustrative quotes about tensions related to the partners timeframes	<p><i>“It takes a bit time, if I’m being critical, I think that it takes too much time to establish [the research center]”</i> (Firm partner 2)</p> <p><i>“[The research center] has a long-term focus, but it is important that they deliver results during [the research centers lifespan]”</i> (Firm partner 5)</p>	<p><i>“When we ask the firms about their challenges, a very few of them manage to look towards the future. There is a large focus on contributing with solving challenges that are affecting the firms today”</i> (Research partner 5)</p> <p><i>“We usually struggle a bit with short timeframes. When everything is supposed to be done very quickly”</i> (Research partner 2)</p>

7. Literature

- AGHION, P., DEWATRIPONT, M. & STEIN, J. C. 2008. Academic freedom, private - sector focus, and the process of innovation. *The RAND Journal of Economics*, 39, 617-635.
- AHMADSIMAB, A. & CHOWDHURY, I. 2019. Managing Tensions and Divergent Institutional Logics in Firm–NPO Partnerships. *Journal of Business Ethics*, 1-20.
- AMBOS, T. C., MÄKELÄ, K., BIRKINSHAW, J. & D'ESTE, P. 2008. When Does University Research Get Commercialized? Creating Ambidexterity in Research Institutions. *Journal of Management Studies*, 45, 1424-1447.
- BAXTER, P. & JACK, S. 2008. Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, 13, 544-559.
- BJERREGAARD, T. 2010. Industry and academia in convergence: Micro-institutional dimensions of R&D collaboration. *Technovation*, 30, 100-108.
- BOARDMAN, C. & GRAY, D. 2010. The new science and engineering management: cooperative research centers as government policies, industry strategies, and organizations. *The Journal of Technology Transfer*, 35, 445-459.
- BRUNEEL, J., D'ESTE, P. & SALTER, A. 2010. Investigating the factors that diminish the barriers to university–industry collaboration. *Research policy*, 39, 858-868.
- BUTLER, S. A. & NEWMAN, H. A. 1989. Agency Control Mechanism Effectiveness and Decision Making in an Executive's Final Year with a Firm. *Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift für die gesamte Staatswissenschaft*, 145, 451-464.
- CANHOTO, A. I., QUINTON, S., JACKSON, P. & DIBB, S. 2016. The co-production of value in digital, university–industry R&D collaborative projects. *Industrial Marketing Management*, 56, 86-96.
- CHESBROUGH, H. 2012. Open Innovation: Where We've Been and Where We're Going. *Research-Technology Management*, 55, 20-27.
- CHESBROUGH, H. W. 2003. *Open innovation : the new imperative for creating and profiting from technology*, Boston, Mass., Harvard Business School Press.
- CHESBROUGH, H. W., VANHAVERBEKE, W. & WEST, J. 2006. *Open innovation : researching a new paradigm*, Oxford, Oxford University Press.
- COHEN, W. M., NELSON, R. R. & WALSH, J. P. 2002. Links and impacts: the influence of public research on industrial R&D. *Management science*, 48, 1-23.
- CRESWELL, J. W. & POTTH, C. N. 2017. *Qualitative inquiry and research design: Choosing among five approaches*, Sage publications.
- CROSSAN, M. M. & APAYDIN, M. 2010. A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. *Journal of Management Studies*, 47, 1154-1191.
- CUNNINGHAM, J. A., MENTER, M. & YOUNG, C. 2017. A review of qualitative case methods trends and themes used in technology transfer research. *The Journal of Technology Transfer*, 42, 923-956.
- D'ESTE, P., GUY, F. & IAMMARINO, S. 2011. Shaping the formation of university-industry research collaborations: What type of proximity does really matter? *Journal of Economic Geography*, 13.
- DAVIDS, M. & FRENKEN, K. 2018. Proximity, knowledge base and the innovation process: towards an integrated framework. *Regional Studies*, 52, 23-34.
- DE MAEIJER, E., VAN HOUT, T., WEGGEMAN, M. & POST, G. 2018. Tread Carefully: Managing Identities and Expectations in High-Tech Industry–Academia Collaborations. *Technology Innovation Management Review*, 8.

- DE WIT-DE VRIES, E., DOLFSMA, W. A., VAN DER WINDT, H. J. & GERKEMA, M. P. 2018. Knowledge transfer in university–industry research partnerships: a review. *The Journal of Technology Transfer*.
- DENZIN, N. K. 2012. Triangulation 2.0. *Journal of mixed methods research*, 6, 80-88.
- DENZIN, N. K. & LINCOLN, Y. S. 1994. *Handbook of qualitative research*, Sage publications, inc.
- DESS, G. G. & SHAW, J. D. 2001. Voluntary turnover, social capital, and organizational performance. *Academy of management review*, 26, 446-456.
- EISENHARDT, K. M. 1989. Building Theories from Case Study Research. *The Academy of Management Review*, 14, 532-550.
- ESTRADA, I., FAEMS, D., MARTIN CRUZ, N. & PEREZ SANTANA, P. 2016. The role of interpartner dissimilarities in Industry-University alliances: Insights from a comparative case study. *Research Policy*, 45, 2008-2022.
- EVELEENS, C. 2018. *Innovation management; a literature review of innovation process models and their implications*.
- FRIEDLAND, R. & ALFORD, R. R. 1991. Bringing society back in: Symbols, practices, and institutional contradictions. *The new institutionalism in organizational analysis*, 232-263.
- GAGNÉ, M. 2018. From Strategy to Action: Transforming Organizational Goals into Organizational Behavior. *International Journal of Management Reviews*, 20, S83-S104.
- GALÁN - MUROS, V. & PLEWA, C. 2016. What drives and inhibits university - business cooperation in Europe? A comprehensive assessment. *R&D Management*, 46, 369-382.
- GHAURI, P. & ROSENDO-RIOS, V. 2016. Organizational cross-cultural differences in the context of innovation-oriented partnerships. *Cross Cultural & Strategic Management*, 23, 128-157.
- GILSING, V., BEKKERS, R., FREITAS, I. M. B. & VAN DER STEEN, M. 2011. Differences in technology transfer between science-based and development-based industries: Transfer mechanisms and barriers. *Technovation*, 31, 638-647.
- GULBRANDSEN, M., THUNE, T., BORLAUG, S. B. & HANSON, J. 2015. Emerging hybrid practices in public-private research centres. *Public Administration*, 93, 363-379.
- HARRISON, D. A. & KLEIN, K. J. 2007. What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of management review*, 32, 1199-1228.
- KRONLID, C. & BARALDI, E. 2020. Time-constrained interactions in public-private collaboration projects. The case of ENABLE. *Journal of Business & Industrial Marketing*.
- KUHN, T. & POOLE, M. S. 2000. Do conflict management styles affect group decision making? Evidence from a longitudinal field study. *Human communication research*, 26, 558-590.
- LAI, I. K. W. & LU, T.-W. 2016. How to improve the university–industry collaboration in Taiwan's animation industry? Academic vs. industrial perspectives. *Technology Analysis & Strategic Management*, 28, 717-732.
- LAM, A. 2011. What motivates academic scientists to engage in research commercialization: 'Gold', 'ribbon' or 'puzzle'? *Research Policy*, 40, 1354-1368.
- LAURSEN, K. & SALTER, A. 2004. Searching high and low: what types of firms use universities as a source of innovation? *Research policy*, 33, 1201-1215.
- LAUVÅS, T. & STEINMO, M. 2019. The role of proximity dimensions and mutual commitment in shaping the performance of university-industry research centres. *Innovation*, 1-27.
- LHUILLERY, S. & PFISTER, E. 2009. R&D cooperation and failures in innovation projects: Empirical evidence from French CIS data. *Research Policy*, 38, 45-57.
- LIU, Y., LUO, Y., HUANG, Y. & YANG, Q. 2017. A diagnostic model of private control and collective control in buyer-supplier relationships. *Industrial Marketing Management*, 63, 116-128.
- LUO, Y., SHENKAR, O. & GURNANI, H. 2008. Control-cooperation interfaces in global strategic alliances: A situational typology and strategic responses. *Journal of International Business Studies*, 39, 428-453.
- MILLER, C. C., CARDINAL, L. B. & GLICK, W. H. 1997. Retrospective reports in organizational research: A reexamination of recent evidence. *Academy of management journal*, 40, 189-204.

- OLIVEIRA, N. & LUMINEAU, F. 2017. How coordination trajectories influence the performance of interorganizational project networks. *Organization Science*, 28, 1029-1060.
- OLIVER, C. 1991. Strategic responses to institutional processes. *Academy of management review*, 16, 145-179.
- PACHE, A.-C. & SANTOS, F. 2010. When worlds collide: The internal dynamics of organizational responses to conflicting institutional demands. *Academy of management review*, 35, 455-476.
- PERKMANN, M., KING, Z. & PAVELIN, S. 2011. Engaging excellence? Effects of faculty quality on university engagement with industry. *Research Policy*, 40, 539-552.
- PERKMANN, M., MCKELVEY, M. & PHILLIPS, N. 2018. Protecting Scientists from Gordon Gekko: How Organizations Use Hybrid Spaces to Engage with Multiple Institutional Logics. *Organization Science*, 30, 298-318.
- PERKMANN, M., TARTARI, V., MCKELVEY, M., AUTIO, E., BROSTRÖM, A., D'ESTE, P., FINI, R., GEUNA, A., GRIMALDI, R., HUGHES, A., KRABEL, S., KITSON, M., LLERENA, P., LISSONI, F., SALTER, A. & SOBRERO, M. 2013. Academic engagement and commercialisation: A review of the literature on university–industry relations. *Research Policy*, 42, 423-442.
- PERKMANN, M. & WALSH, K. 2007. University–industry relationships and open innovation: Towards a research agenda. *International Journal of Management Reviews*, 9, 259-280.
- PLEWA, C., QUESTER, P. & BAAKEN, T. 2005. Relationship marketing and university-industry linkages: a conceptual framework. *Marketing Theory*, 5, 433-456.
- PONOMARIOV, B. L. & BOARDMAN, P. C. 2010. Influencing scientists' collaboration and productivity patterns through new institutions: University research centers and scientific and technical human capital. *Research Policy*, 39, 613-624.
- POOLE, M. S. & VAN DE VEN, A. H. 1989. Using paradox to build management and organization theories. *Academy of management review*, 14, 562-578.
- PRÆST KNUDSEN, M., TRANEKJER, T. L. & BULATHSINHALA, N. 2019. Advancing large-scale R&D projects towards grand challenges through involvement of organizational knowledge integrators. *Industry and Innovation*, 26, 1-30.
- ROTH, G. L. & MAGEE, C. L. 2002. Corporate-university alliances and engineering systems research.
- SAUERMAN, H. & STEPHAN, P. 2013. Conflicting logics? A multidimensional view of industrial and academic science. *Organization science*, 24, 889-909.
- SCANDURA, A. 2016. University–industry collaboration and firms' R&D effort. *Research Policy*, 45, 1907-1922.
- SEGARRA-BLASCO, A. & ARAUZO-CAROD, J. M. 2008. Sources of innovation and industry-university interaction: Evidence from Spanish firms. *Research Policy*, 37, 1283-1295.
- SMITH, W. K. & LEWIS, M. W. 2011. Toward a theory of paradox: A dynamic equilibrium model of organizing. *Academy of management Review*, 36, 381-403.
- STEINMO, M. 2015. Collaboration for innovation: A case study on how social capital mitigates collaborative challenges in university–industry research alliances. *Industry and innovation*, 22, 597-624.
- STYHRE, A. & LIND, F. 2010. Balancing centripetal and centrifugal forces in the entrepreneurial university: a study of 10 research centres in a technical university. *Technology Analysis & Strategic Management*, 22, 909-924.
- THOMAS, K. W. 1992. Conflict and conflict management: Reflections and update. *Journal of organizational behavior*, 265-274.
- THOMAS, K. W. & KILMANN, R. H. 1974. *Thomas-Kilmann Conflict Mode Instrument*, XICOM.
- THUNE, T. & GULBRANDSEN, M. 2014. Dynamics of collaboration in university–industry partnerships: do initial conditions explain development patterns? *The Journal of Technology Transfer*, 39, 977-993.
- TIDSTRÖM, A. 2014. Managing tensions in coopetition. *Industrial Marketing Management*, 43, 261-271.

- TIJSSEN, R. J. W. 2018. Anatomy of use-inspired researchers: From Pasteur's Quadrant to Pasteur's Cube model. *Research Policy*, 47, 1626-1638.
- VAN FENEMA, P. C. & LOEBBECKE, C. 2014. Towards a framework for managing strategic tensions in dyadic interorganizational relationships. *Scandinavian Journal of Management*, 30, 516-524.
- VEGA-JURADO, J., KASK, S. & MANJARRÉS-HENRIQUEZ, L. 2017. University industry links and product innovation: cooperate or contract? *Journal of technology management & innovation*, 12, 1-8.
- WELCH, C. & WILKINSON, I. 2005. Network perspectives on interfirm conflict: reassessing a critical case in international business. *Journal of Business Research*, 58, 205-213.
- YIN, R. K. 2014. *Case study research : design and methods*, Los Angeles, SAGE.