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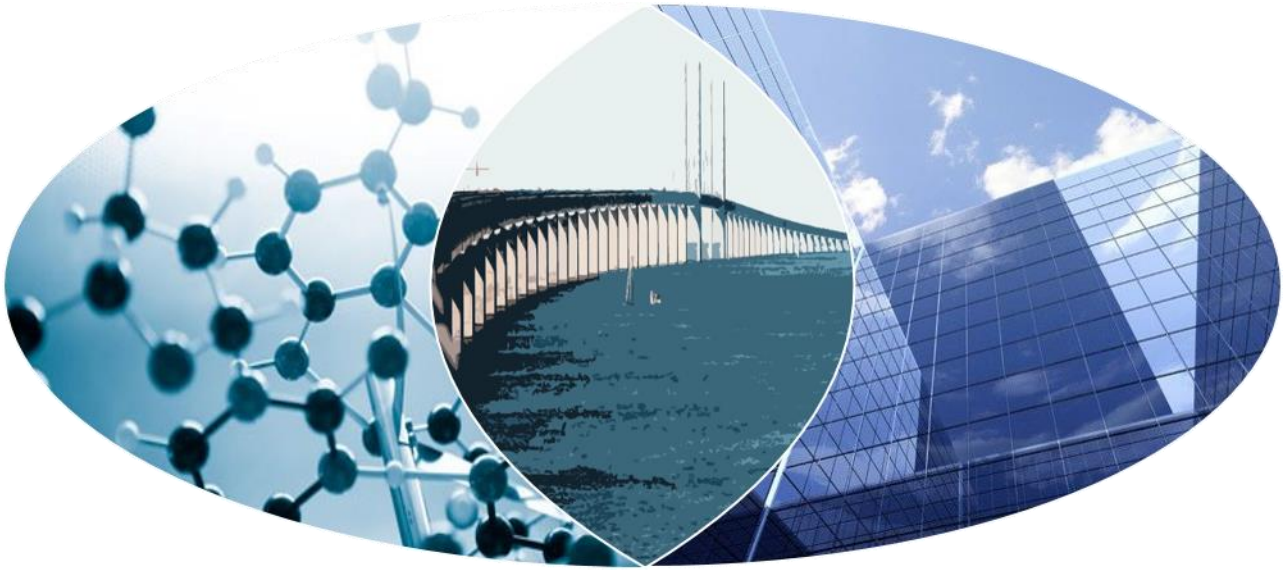
University-Industry Intermediaries as Facilitators for Innovative Ecosystems



A Comparison of Denmark and Sweden

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Abstract

This dissertation examines technology transfer offices' management of proximity between university scientists and industry players during technology transfers of licensed university-owned patents. The study applies a comparative research design, using greater Copenhagen and Scania as proxies for Denmark and Sweden. More specifically, the technology transfer offices at University of Copenhagen and Lund University represent the objects for the analysis. The reason behind the juxtaposition of the two economies derives from an interesting difference in academia's ownership of intellectual property.

The cases studies rest on qualitative data collected from semi-structured interviews of the staff from the technology transfer offices, university scientists and employees from the private sector. The theoretical framework of proximity guides the investigation of the TTOs ability to facilitate the technology transfer process within four dimensions: cognitive, organizational, institutional and social. Each dimension holds an array of items, which in sum determine the TTO's performance. Due to the difference in institutional and inventor ownership in Denmark and Sweden respectively, the dissertation assumes TTOs in Sweden experience greater difficulties in managing proximity.

The dissertation finds the Swedish TTO has particular complications in managing the technology transfer process within the institutional dimension as the inventor ownership creates roadblocks for mediation. These roadblocks also negatively influence the organizational dimension, where behavioural routines and incentives hampers the Swedish TTO's creation of a shared space of relations. Within the cognitive and social dimensions, Denmark and Sweden differ on the individual underlying items, but perform overall equally.

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1. Introduction

Denmark and Sweden represent leading countries in producing world-class university research and investment in research and development (R&D) relative to gross domestic product (GDP). However, neither have yet excelled at transferring their scientific endeavours into commercially valuable products and services in the industrial sector (Damsgaard & Thursby, 2013; Okkels, 2017). This paradox is on the radar of both administrations, stressing its relevance, and likewise constitutes the impetus for this dissertation. The purpose is to examine how university-industry (U-I) intermediaries take part in solving the anomaly, while taking into account the institutional variations in academia between the two economies. In particular, the dissertation scrutinizes the role played by technology transfer offices (TTOs) at universities in managing the patenting and licensing of scientific discoveries to private companies. As current market competition drives greater demand for universities to commercialize technology faster and more effectively, the need for intermediation grows proportionally in importance.

The urgency in transferring scientific and technological expertise from universities to industries has reached top priority in political agendas across the European continent as part of national strategies for maintaining competitiveness (Debackere & Veugelers, 2005). Hence, any interaction between universities and corporations presently receives considerable attention, especially after the arrival of the digital information age. This cements the transition to the knowledge economy and brings higher requirements for technology innovation through inventive products and automated processes. Since scientific knowledge constitutes a key component in this development, academia experiences new expectations for taking on greater initiative in promoting innovation by transferring technology to enterprises (Etzkowitz, 2003). Universities increasingly expand their remit within teaching and research to encompass market-oriented activities aiming towards a “third mission” of socio-economic impact (Geuna & Musico, 2009).

This tendency witnessed substantial traction following the amendments of authority over university property rights in the United States in 1980 (Rothaermel, Agung, & Jiang, 2007), which paved the way for universities to capitalize on their research.

Consequently, the TTO emerged as an essential vehicle to claim title of university intellectual property (IP) and convert it into income generating streams to fund subsequent scientific efforts. As universities have become gradually enterprising, there is now a greater focus on improving proficiency within the various types of technology transfer; patenting, licensing, among others have seen rapid progress (Kirkland, 2005). This trajectory is a testimony to the institution's increasingly vital role in innovation systems, becoming a power motive in the development of industries. The expansion in activities related to commercial exploitation has exerted influence on the nature of the interaction with industry in the last few decades (Bruneel, D'Este, & Salter, 2010).

Firms frequently resort to external sourcing from universities as a fundamental supplement to their internal knowledge base (Steinmo & Rasmussen, 2016). The interest from the private sector follows struggles to develop innovation extending beyond their own capabilities due to resource path-dependency (Sandström, Magnusson, & Jörnmark, 2009; Penrose, 1959). Moreover, as production methods and business models in companies rely progressively on more information and data while R&D activities become more sophisticated and costly (Geuna & Musico, 2009; Litan, Mitchell, & Reedy, 2007), universities present an obvious resource to purchase and license inventions from.

The transfer of scientific knowledge and technology from the university to industry, however, is a complex endeavour due to a lack of overlap between the social networks and institutional logics of the two actors (Wright, Clarysse, Lockett, & Knockaert, 2008; Murray, 2010; Sauermann & Stephan, 2013). Accordingly, it is common to observe stakeholder interests, expectations and norms diverge significantly with respect to the purpose of public research. The university and its scientists adhere to a paradigm driven by research freedom, autonomy, full disclosure and dissemination of scientific discoveries to society and search for fundamental knowledge (Merton, 1973; Nelson, 2004). On the contrary, profit maximization, market competition, applied research, limited disclosures and financial returns from research govern companies (Aghion, Dwatripont, & Stein, 2008; Fini and Lacetera, 2010; Gittelman and Kogut, 2003; Lacetera 2009; Vallas and Kleinman, 2008).

There is high uncertainty associated with technology transfers because university inventions often belong to an embryonic stage with need of additional development (Thursby & Thursby, 2007). This also means insights on the demand for the IP is limited (Hoppe & Ozdenoren, 2005), which is complicated by the complexity in today's innovation models. The assessment of the IP's commercial value has consequently many unknowns built into it, which may increase the likelihood of opportunistic behaviour to reap the benefits of the contractual agreement (Williamson, 1993).

The TTO therefore faces the challenge of reconciling the discrepant objectives, bridging the mind-sets and mitigating the risks accompanying the U-I commercialization process. Presently, a series of barriers hinder the common understanding of heuristics, shared relations, agreement on established practices and trust building. All of them oppose the TTO's objective of facilitating U-I interaction.

Managing proximity along these cognitive, organizational, institutional and social dimensions is a precondition for effective U-I technology transfer. Critical voices question the TTO's ability to fulfil this mandate, as it receives mixed performance reviews among scholarly work. TTOs performance has attracted particular watchfulness from U.S. academics; however, awareness in Europe is catching up. Hence, there is room for further exploration within the Nordic countries, including Denmark and Sweden. Thus, the research question arises:

> *In the context of greater Copenhagen and Scania, how are TTOs trying to manage proximity between universities and industries when licensing university-owned patents and what challenges arise during this process?*

Greater Copenhagen and Scania comprise an interesting comparison, forming part of a cutting-edge Life Science and biotech cluster. The resemblance in university and industry activities lend the geographies as qualified proxies for Denmark and Sweden, each with vastly different approaches to academia's IP ownership. These conditions

inspire a motivation to scrutinize the dynamics of the regions' technology transfer processes.[1]

To unfold the research question, the dissertation commences with a delimitation of the subject, clarifying the TTO's placement in the innovation ecosystem. This demarcation sets the guidelines for the following literature review, which contextualizes the dissertation within the field of research and technology commercialization. The literature review summarizes, discusses and assesses the latest academic contributions. Such procedure will identify the gaps in the literature and pave the way for the theoretical outline in the shape of proximity theory.

The project then applies the theory to a comparative case study analysis of Denmark and Sweden, based on qualitative methods. Three stakeholders, the scientist, the TTO and the firm, comprise the empirical foundation. The project resorts to deductive reasoning, using qualitative data in the form of in depth interviews to assess the chosen theory. The analysis uses the University of Copenhagen (UoC) and Lund University (LU) as proxies for academia, contemplating how well the respective TTOs are capable of engendering proximity between scientists and industry. Firms situated in greater Copenhagen and Scania will represent the latter. Finally, the dissertation presents my conclusions from the study, provides a suggestive answer to the research question and derives the implications of my results.

2. Delimitation of the Subject

The analytical focal point of the dissertation is TTOs and their involvement in commercialization of scientific research and knowledge via patenting and licensing to industry players. This decision emanates from an interest in the health of the larger innovation ecosystem within which the TTO act as a mediating institution for improving the bond between university science and industrial innovation. Hence, the line of thought behind the project, takes point of departure in why certain clusters of

[1] For a more elaborate account, please see section 5.2 on case selection.

innovation, such as Silicon Valley, outperform other regional ecosystems (Engel & del-Palacio, 2011).

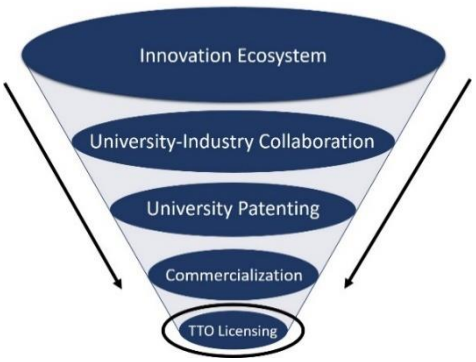
2.1 Regional Innovation Ecosystem

The initial birds' perspective view the network of universities, R&D centers, mature corporations, start-ups, institutional investors, accelerators and incubators, service providers and governmental agencies, comprising the broader innovation ecosystem (Lundvall, 1992; Engel, 2015). The rationale supporting this stems from the wide recognition that national productivity and innovation capacity hinges upon the character and intensity of the interaction among these actors (Nelson & Rosenberg, 1993; Freeman, 1995; Breschi & Malerba, 1997). Figure 1 in Appendix 1 illustrates the respective components of the innovation ecosystem.

Further considerations continued in the footsteps of the national innovation system (NIS) approach, advocated by Lundvall (1992) and Nelson (1993). From their perspective, interactive learning and knowledge accumulation among the institutions are a perquisite for technology creation and utilization. The NIS framework regard the interface between knowledge-producing organizations, such as universities and public research centers, and corporations as decisive for unleashing society's innovative potential (Smith, 1995; Van Looy, et al., 2011). This starts a chain of reasoning for narrowing the subject to include the dynamics between universities and corporations only.

2.2 University-Industry Collaboration

Figure 2. Literature Analysis



Such reduction in scope automatically leads to a step down the literature funnel to the domain of university-industry collaboration (UIC), which takes root in knowledge and innovation transfer processes between the two parties for the benefit of socio-economic development (Draghici, Baban, Gogan, & Ivascu, 2015). Using the UIC framework as benchmark for subsequent subject specification, introduces a wide array of university linkages with the industrial environment. These may culminate in research partnerships,

research services, academic entrepreneurship, human resource transfer, informal interaction, commercialization of property rights and scientific publications (Perkmann & Walsh, 2007). All collaborative avenues provide opportunities for universities to advance their research by obtaining access to materials, equipment, idea testing and alternative sources of funds from industry players (D'Este & Perkmann, 2011; Ehrismann & Patel, 2015).

In return, spurred by the knowledge influx from universities, firms acquire the means to push new technological advancements and raise their productivity beyond what would be possible relying only on their own internal capabilities (Barnes, Pashby, & Gibbons, 2002). This progress eventually drives further industrial needs for additional university knowledge sourcing, stressing how critical the spill-over is from universities' pool of resources. Academic research is especially crucial for science-heavy industries such as pharma and biotech, whose innovation models highly depends on the provision and quality of the scientific knowledge (Ponds, van Oort, & Frenken, 2010).

The frequency through which universities transfer their scientific discoveries to industry is on the rise and the U-I relationship gain in depth as firms are compelled to augment their capacities more rapidly. The mechanisms to complete the technology handover from the university to industry can be manifold, ranging from sale of licences, contract research, publications, entrepreneurship and patents (D'Este & Perkmann, 2011). Out of those options, the dissertation zooms further in on university patents. This is due to their critical nature in the majority of university research transactions and in incentivising university inventions (Eisenberg, 1996).

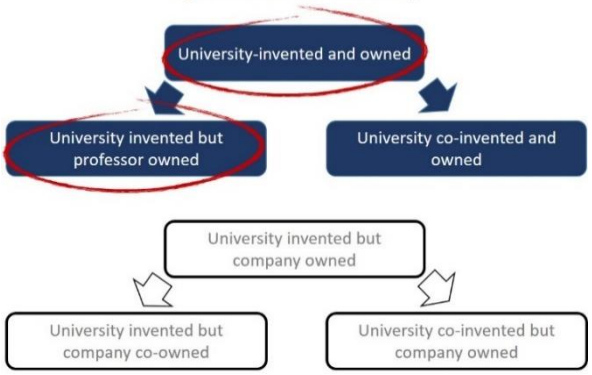
2.3 University Patenting

Looking at patenting in isolation, it forms part of two of the three fundamental tasks universities undertake in the innovation ecosystem in relation to technology transfers. These count scientific research processing to push the industry's technological frontier and developing techniques ready for application in production (Schartinger, Rammer, Fischer, & Frölich, 2002). The third responsibility concerns the supply of talented human capital through education of graduates among others (ibid.), which belongs to the category of labour mobility (Breschi & Lissoni, 2003). As last-mentioned has less

relevance for university patenting, this knowledge spill-over mechanism falls outside the scope of the dissertation.

What has relevance is that university patenting is booming, although previous findings show close to 50% of university patents are never licensed (Hsu & Bernstein, 1997; Mowery & Ziedonis, 2001). There is now evidence that university patenting currently grows, exemplified by the patenting propensity by universities (Nelson, 2001). This could be an indication of a positive change in perception of the benefits derived from patent protection among university faculty and greater confidence in disclosing scientific discoveries. Such behaviour implies an improvement in patent effectiveness, which not only provides better conditions for appropriating the returns on innovation, but also reduces the probability of license termination (Shane, 2002). Having a patent system that decreases transaction cost of technology transfer greatly motivates invention commercialization, which can follow different trails.

Figure 3. Patent Ownership



One must show caution, as the phenomenon vary across countries and scientific disciplines (Geuna & Nesta, 2006) and be aware of the how the literature distinguish between two tracks within patenting. The first focuses on patents invented and owned by the university and the second on university-invented but company-owned patents. Both constellations have by definition a member of university faculty among the inventors, however, the university is also the patent assignee in the former in contrast to the latter (Geuna & Nesta, 2006). This dissertation strictly looks at patents invented and owned by the university and professor as illustrated in figure 3 on the right. That is, the dissertation does not consider any form of co-patenting and co-ownership between the university and industry, nor IP invented by the university but owned by the company. The reasoning behind this choice originates firstly from the unbalanced relationship in the literature towards business owned patents rather than academic owned patents. It is secondly driven by the trend of rising IP university ownership (Coupé, 2003) and

thirdly that academic involvement results in greater knowledge externalities for the benefit of wider society (Czarnitzki, Hussinger, & Schneider, 2008).

As the interest of the dissertation is to investigate what obstacles hinder the journey of scientific knowledge to industry, it comes natural to limit the literature funnel even further to pathways for commercialization.

2.4 Commercialization

The public interest in stimulating commercialization practices has taken new heights in recent times. Politicians as well as a wide variety of institutional players involved in research and innovation are the main drivers pushing through this agenda (Gulbrandsen & Smeby, 2005). The general notion is that commercialization leaves a positive footprint on society, although it essentially revolves around the objective of exploiting academic inventions to reap financial rewards (Perkmann, et al., 2013). Since commercialization is an immediate, measurable market acceptance for academic research results, many consider it as a prime example for generating academic impact and benefits (Markman, Siegel, & Wright, 2008). In that context, it is with little surprise that universities state their commitment to establish strong links with the commercial sector by expediting technology transfer through commercialization of academic knowledge (Etzkowitz, Webster, Gebhard, & Terra, 2000; Siegel, Waldman, & Link, 2003; Gulbrandsen & Slipersæter, 2007).

There are various ways to commercialize; however, two modes are relevant when dealing with university-owned patents. These either take the form of licensing of patented IP in return for fees and royalties or academic entrepreneurship i.e. the founding of a firm (Shane, 2004; Jensen & Thursby, 2001). Both alternatives typically follow academic engagement with industry, i.e. more loose collaborative arrangements e.g. in the shape of collaborative research, consulting and contract research (Abreu, Grinevich, Hughes, & Kitson 2009; Bonaccorsi & Piccaluga, 1994; D'Este & Patel, 2007). Such prior interaction often leads to novel insights among academics, allowing them a better starting point for estimating the market potential of their ideas. This ultimately affects the opportunity to develop patentable and licensable inventions or build new ventures.

Due to the expansion in commercial activities, universities now meet demands for managing tasks extending beyond their original competency base. Hence, in order to offer legal advice, protect IP, provide opportunity recognition and commercialization skills alike (Siegel, Veugelers, & Wright, 2007), universities see it necessary to design new policies and specialized internal structures. Such initiatives resulted in the establishment of TTOs, science parks and incubators, among others (Clarysse, Wright, Lockett, Van de Velde, & Vohora, 2005; Siegel, Waldman, Atwater, & Link, 2003).

A majority of universities choose to centralize all commercial efforts to the TTO by requiring faculty members to use this institution as the single point of contact when disclosing their discoveries (Litan, Mitchell, & Reedy, 2007). Consequently, the scientists delegate all rights to the TTO to negotiate licensing agreements with private actors on their behalf. This creates a clearer separation between commercial efforts and scientific research run by the TTO and scientist, respectively. The university is thus better equipped to handle the expectation for progressing the extent of commercialization and demonstrate its contribution to the economy (Rasmussen, Moen, & Gulbrandsen, 2006). At the same time, the university has easier premises for balancing its remaining central purposes, i.e. education and fundamental research.

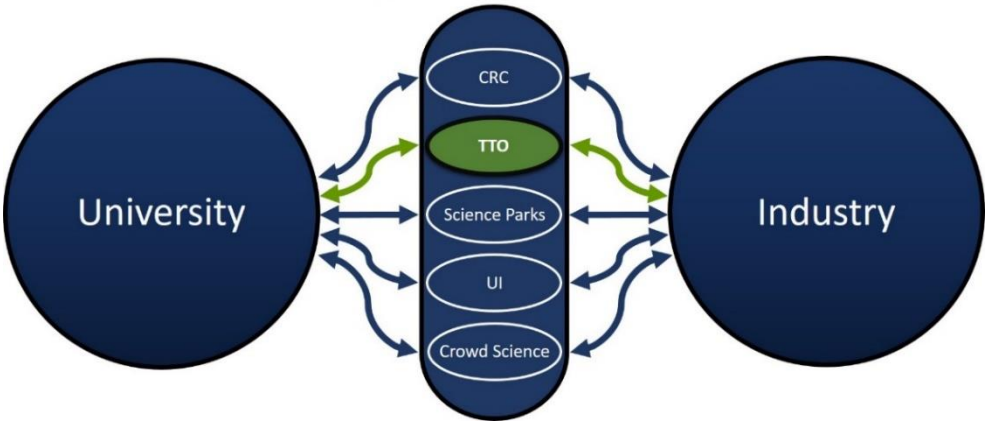
Because of the TTO's centrality in the commercialization process, there is a strong rationale for prioritizing the organization over other intermediaries. That is, taking a final step down the literature funnel, the project confines itself to look at the commercialization activities performed by the TTO only. More specifically, licensing rather than academic entrepreneurship comprises the commercialization mechanism under investigation. The interest in the former derives from the discovery that equity stakes in start-up firms generate revenues ten times higher than licensed patents (Bray & Lee, 2000). Certain scholars blame the disrupting effect of patent litigation on licensing and marketing activities (Shane & Somaya, 2007), while others accentuate financial unsustainability (Thursby & Thursby, 2007). The discrepancy awakes an appetite for diving into the organizational practices of TTO licensing.

2.5 TTO Licensing

The TTO's role in facilitating licensing agreements, between suppliers of innovation (university scientist) and buyers who wish to apply it commercially (firms), has significant economic and policy implications. These effects come forth in new possible revenue streams for the university, employment opportunities for university-based researchers and technological spill-overs through the stimulus of additional R&D investment and job creation in the economy (Dalmarco, Dewes, Zawislak, & Padula, 2011). Hence, the TTO has flourished at universities across Europe as part of national innovation strategies to increase the research uptake for the public good and develop mutual beneficial ties with the industry (Ambos, Mäkelä, Birkinshaw, & D'Este, 2008; Ustundag, Urgulu, Kilinc, 2011).

The TTO's operations thus take up a prominent presence in the intermediary landscape, which consists of collaborative research centers (CRC), sciences parks, university incubators (UI), among others (Villani, Rasmussen, & Grimaldi, 2017; Bruneel, D'Este, &

Figure 4. Intermediary Ecosystem



Salter, 2010; Franzoni & Sauermann, 2014).[2] Together, they form their own ecosystem offering multiple routes for U-I links. The TTO, however, remains the unit of analysis rather than looking at groups of intermediaries between the university and industry.

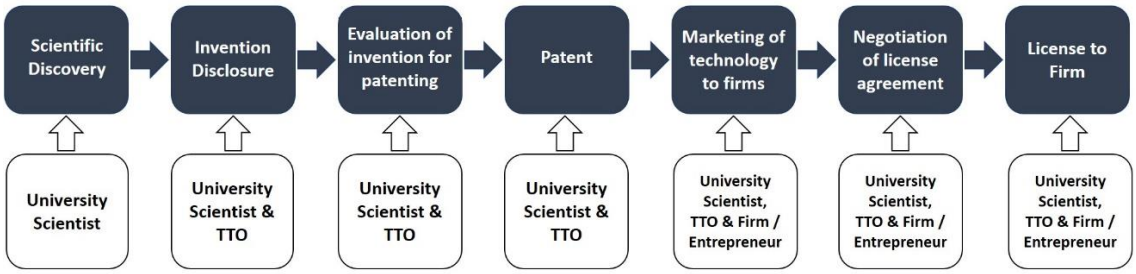
This dissertation consequently does not contemplate the activities performed by other boundary organisations as depicted in the model above. There will not be conducted any assessment of the role each intermediary holds relative to the others in terms of

[2] The list of intermediaries in figure 4 is not exhaustive, but merely shown for illustrative purposes.

different phases of U-I collaboration. Attention is devoted entirely to the commercial exploitation of university IP through TTOs, in particular, activities related to IP licensing. Thus academic entrepreneurship i.e. spin-offs from the university, contract research, collaborative research and consulting services, among others, are not discussed in this dissertation.

Figure 5 depicts the exact licensing process conducted by the TTO together with the different stakeholders involved. This sequence, commencing with a faculty member filing an invention disclosure to the final stage of selling a licensed technology to a company, constitutes the backdrop for the dissertation. Emphasis is on the TTO's management of the technology transfer; however, the dissertation includes the perspectives of three stakeholders, university scientists, university technology managers and company representatives.

Figure 5. Licensing Technology Transfer Process



Source: Siegel, Waldman, Atwater, 2003, *Commercial knowledge transfers from universities to firms: improving the effectiveness of university-industry collaboration*

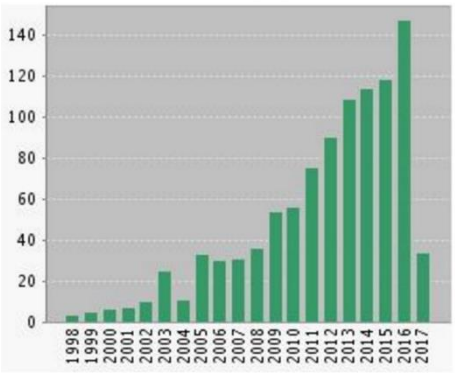
The considerations and demarcations of the dissertations' scope reflect how the following review of the literature unfolds.

3. Literature Review

The size of the literature within the subject of university and industry relationships has grown significantly in the wake of the recent excitement around the prospective benefits associated with utilizing university research and technology in a commercial context. Starting as a niche strand, it now mounts to a considerable body with contributions from various academic fields, including science and innovations studies, sociology, business studies, economics, history, among others (Geuna & Musico, 2009).

How the university administers its technology and innovation management, attracts considerable attention ignited by the expansion of activities related to e.g. patenting, licensing and spinouts. This created the breeding ground for the now established academic field of university entrepreneurship constituted by four major research streams: entrepreneurial research university, productivity of TTOs, new firm creation, environmental context including networks of innovation (Rothaermel, Agung, & Jiang, 2007). The study saw 173 academic articles published globally from 1981 to 2005, 127 alone between 2000 and 2005, and has since then witnessed exponential growth in research output (Rothaermel, Agung, & Jiang, 2007). The total population of articles is now more than 850, corresponding to an increase of almost 600% and close to an average of 86 articles a year since the infancy (SSCI, 2017).

Figure 6. Published Items in Each Year



Source: Web of Science Core Collection

The accumulation of scientific contributions testifies to the existence of a growing literature on innovation via university patenting and licensing. A wide range of scholars have scrutinized the influence from the design of university departmental features together with the technology transfer infrastructures for commercialization (Owen-Smith & Powell, 2001; Siegel, Waldman, Atwater, & Link, 2003; Lockett & Wright, 2005). Many express specific interest in TTOs operating in the U.S. due to the introduction of the Bayh-Dole Act of 1980; however, Europe is gaining momentum (Conti & Gaule, 2011).

The amount of theoretical and empirical evidence on innovation via patenting and licensing may be burgeoning. However, the literature remains somewhat thin when it comes to displaying the processes governing commercialization of scientific research across TTOs in Scandinavia. One of the closest contributions to such research design is Valentin & Jensen's (2007) article comparing the impact of universities' property rights extension on the collaboration between scientists and biotech firms in Denmark vs. status quo in Sweden. Another close candidate is Sellenthin's (2009) article on factors

influencing researchers' decision to patent their research results when engaging with TTOs, benchmarking Sweden against Germany. Damsgaard & Thursby's (2013) comparison of institutional regimes' influence on modes of commercialization in the U.S. and Sweden has resemblance as well.

Yet others have compared the tendencies within academic patenting statistically in Denmark and Sweden post changes in IP ownership (Lissoni, Lotz, Schovsbo, & Treccani, 2009). Similar, but separate, statistical summaries have looked at Sweden in company with other European nations and Denmark in isolation (Lissoni, Llerena, McKelvey, & Sanditov, 2008; Baldini, 2006). Finally, an array of researchers have contemplated the university's role in regional innovation systems (Nilsson, 2006; Benneworth, Coenen, Moodysson, & Asheim, 2009).

Overall, it seems there is an opening in the literature for a comparison of what challenges TTOs face dealing with institutional and inventor ownership in Denmark and Sweden, respectively. The timing is right for bringing forth vital insights for policymakers and TTO managers. This entails a deeper analysis and evaluation of the licensing technology transfer process presented in figure 5 in chapter 2, which in earnest entered the limelight 30 years ago with legislative changes to university property rights.

3.1 Changes in University Property Rights

The year of 1980 marked a landmark for the future configuration of university governance, following the passage of the Patent and Trademark Amendment Act, known as the Bayh-Dole Act, in the U.S. The main rationale behind signing the act stemmed from the conviction that too many discarded university inventions because of the reluctance from potential licensees to inject capital in commercialization of technologies without assurance of exclusivity in the market place (Eisenberg, 1996; Mowery & Sampat, 2001). If universities took control of IP ownership and management, U.S. legislators claimed the commercialization practice would accelerate for the benefit of entrepreneurial activity and the economy. As this political argument prevailed, universities in the U.S. acquired the right to own and to license inventions funded by government (Agrawal, 2001). In practice, the new legislation paved the way for a

standardization of patenting rules for universities and industries and kick-started a boom in the formation of TTOs (Aghion, Dewatripont, & Stein, 2008).

The growth in TTOs became a bi-product in the aftermath of the Bayh-Dole Act, causing university licensing productivity to skyrocket according to Lach and Schankerman (2004). U.S. patent awards to university inventors climbed from 500 in 1982 to beyond 3,100 in 1998, the number of executed licenses on university inventions more than tripled and gross licensing revenues rose seven-fold in the decade from 1994 to 2004 (Lach & Schankerman, 2004).

The evident positive outcome in America caused stir among politicians in the rest of the world. In the European context, there was a strong desire after a similar success formula due to an allegedly poor contribution of universities to economic development (Geuna & Musico, 2009). This led to replications of the Bayh-Dole Act, embodied in a reorganization among universities in Europe, propelled by policymakers' intention to recreate a comparable environment to that in the U.S. Apart from the observations in the U.S., concerns about an unwillingness or incapability of individual researchers to attempt commercial application of inventions through patenting and licensing contributed to the transformation as well (Czarnitzki, Hussinger, & Schneider, 2008).

This undermined a common patent ownership format in Europe, known as the "professor's privilege. Under this regime, university scientists have no obligation to disclose inventions produced by means of public funds, report licensing activities to the TTO nor share the income from commercialization with the university (Conti & Gaule, 2011; Damsgaard & Thursby, 2013). It is entirely up the university scientist to patent the invention, who has the legal disposition to draw a license agreement with any external party. One of the arguments supporting this ownership structure is that researchers feel disclosure duties threaten their research freedom (Lissoni, Lotz, Schovsbo, & Treccani, 2009). Another claim is the professor's privilege shields the university from incurring costs and risks associated with patenting (Geuna & Rossi, 2011). University scientist were in favour of the "university invented, but professor owned" patent design, whereas policy makers cheered for university invented patent ownership.

The objections from the scientists could not contain the beginning of a system transition from inventor to institutional ownership of patent rights, resulting in an abolishment of the professor's privilege in several countries. The Danish government was one of the first-movers and allocated substantial funds for novel technology transfer infrastructure (Lissoni, Lotz, Schovsbo, & Treccani, 2009). Despite the general accepted notion, certain nations departed from the crowd. The professor's privilege in Sweden prevailed although politicians made serious considerations to eliminate it (Lissoni, Llerena, McKelvey, & Sanditov, 2008). Scientists thus preserved ownership of their results and the privilege is still applicable today.

The divergence pose an interesting backdrop for taking a deeper look at the mechanics supporting academia's participation in the transfer of technology to enterprises in Denmark and Sweden. This suggests a reflection on the intermediaries born for that purpose.

3.2 The Emergence of Intermediary Organizations

Various intermediary organizations emerged over the past decades to promote U-I links. These include technology transfer offices (TTO), collaborative research centers (CRC), university incubators (UIs) and increasingly open data U-I collaborative initiatives in the shape of online crowd-based platforms, where research results are published with no restrictions (Perkmann & Schildt, 2015). All of them gear the university to engage proactively in technology and knowledge transfers by taking on accountability to facilitate transfers between transacting parties through value-added services (Wright, Clarysse, Lockett, & Knockaert, 2008). Such task implicitly entails a conveyance of influence between the constituents, i.e. scientist, university and industry, by communicating perceptions and anticipations. Such balancing act only needs to stray by a fraction before it severely hinders the research and technology transfer.

That is, technology commercialization is today increasingly contingent on the capabilities and competences of these intermediate vehicles to engage with commercial actors and manage the transfer of expertise and knowledge (Alexander & Martin, 2013). This trend has caught the spotlight of scholarly work with several studies concentrating on exploring the enabling and impeding factors determining the efficacy of the bridge

building process (Siegel, Waldman, Atwater, & Link, 2004; Bercovitz, Feldman, Feller, & Burton, 2001; Markman, Gianiodis, Phan, & Balkin, 2005). Patenting and licensing activities, in particular, attracts scrutiny (Thursby & Kemp, 2002), which fall under the management of TTOs.

TTOs have enjoyed a dominant presence in the technology management literature over decades, representing a key determinant for the well-being of the innovation and commercialization ecosystem. This has invited certain groupings of publications related to TTOs under different titles: organizational structures, impacts of university research, tangible outputs of university research, efficiency of university research transfer and regional or international comparisons, including case studies (Anderson, Daim, & Lavoie, 2007; Ustundag, Urgurlu, & Kilinc, 2011). Although the perspectives vary within the grouped publications, they have TTO performance measurement as a shared trait. Performance, a synonym for efficiency and productivity, is a standard measurement when contemplating either the TTO's internal mechanics or its surrounding environment.

The topic on organizational structures has gathered scholars attributing managerial, motivational, informational and cultural barriers as preventive factors for effective commercial knowledge transfer (Siegel, Waldman, Atwater, & Link, 2003, 2004; Siegel, Veugelers, & Wright, 2007). Others have turned more towards structural approaches, analysing university organizational forms' impact on TTO's transaction output and coordination of licensing (Bercovitz, Feldman, Feller, & Burton, 2001). Yet others emphasize the quality and research orientation of the academic institution and the TTO's staff capacity, experience and reward systems (Conti & Gaule, 2011; Lach & Schankerman, 2004; Friedman & Silberman, 2003). Building from these contributions, Schoen, Potterie and Henkel (2014) deepen the conceptual understanding for how to govern TTOs efficiently according to organizational configuration; however does not consider the interplay with scientists and industrial counterparts.

Studies evaluating TTO productivity empirically, using the in- and outputs of technology transfer as measure for licensing efficiency also view TTOs in isolation (Foltz, Barham, &

Kim, 2000; Thursby, Jensen, & Thursby, 2001; Thursby & Kemp, 2002; Chapple, Lockett, Siegel, & Wright, 2005; Van Looy, et al., 2011; Ustundag, Urgurlu, & Kilinc, 2011). Same goes for those studying TTO's tangible output as a proxy for performance with reference to financial sustainability (Trune & Goslin, 1998), patents (Owen-Smith & Powell, 2001; Agrawal & Henderson, 2002; Mowery, Sampat, & Ziedonis, 2002; Shane, 2002, Sellenthin, 2009; Baldini, 2006) and licenses (Macho-Stadler, Martinez-Giralt, & Pérez-Castrillo, 1996; Thursby & Thursby, 2007; Shane & Somaya, 2007).

Regional or international comparisons and case studies, on the other hand, brings an appealing holistic approach. To reach an effective commercialization process requires a more complete systematic methodology; although it consists of many important individual elements, deserving sufficiently care. Within this sub-literature, contributions include cross-country analyses of university policies and initiatives to enhance commercialization of research activities (Rasmussen, Moen, & Gulbrandsen, 2006). One of many responses regard e.g. the activation of transfer mechanisms such as equity licensing and royalties. These mechanisms suggest key strategic advantages for revenue generation and interest alignment of universities, scientists and industry (Feldman, Feller, Bercovitz, & Burton, 2002).

On a macroeconomic level, it is deliberated what relevance national policies have across countries in terms of those that are most efficient in promoting commercialization of university-generated knowledge (Goldfarb & Henrekson, 2003). At the other end of the spectrum, comparative studies emerge with a micro lens on universities' ability to invent. These studies leverage the nature of invention reported projects, motivations for research and the connections to industry to advance the understanding of what the TTO role entails in detail (Colyvas, et al., 2002). Further comprehensive studies on cross-university assessments of technology transfer efficiency supplement this endeavour, placing services related with transferring research into other sectors as the core of the analysis (Anderson, Daim, & Lavoie, 2007).

With the preceding research in mind, there appears a need to move beyond considerations of TTO's performance in isolation during the commercialization process.

What yet remains is a thorough address of the impact of the mutual in- and outflow of tacit heuristics, rules, norms and beliefs with the two remaining stakeholders, scientists and company representatives. This will help shed greater light on potential efficiency and productivity issues experienced by the TTO. For that purpose, it is reasonable to apply a multilateral analytical framework that integrates the interdependence among cognitive, organizational, institutional and social dimensions of the U-I interplay. This provides an adequate starting point for evaluating the effectiveness of TTO's inter-organizational collaboration (IOC) with industry and scientists and simultaneously reveal the most predominant barriers.

3.3 University-Industry Collaboration Barriers

Scholars have listed numerous factors working against U-I collaboration, viewed either internally or externally to the TTO, scientist or company. Some emphasize institutional disparities (Bruneel, D'Este, & Salter, 2010; Sauermann & Stephan, 2013) others cultural (Bjerregaard, 2010) and regulatory barriers (Jacobsson & Karltorp, 2013). Still others have indexed the barriers into different tiers according to structural conditions, institutional characteristics and individual motivations (López-Martínez, Medellín, Scanlon, & Solleiro, 1994). Here structure refers to the influence from political, economic and technological macroeconomic factors, while the administrative apparatus of the university and company makes up the latter. Motivational barriers relate to what incentives drive scientists and company representative.

Out of the available terminology, López-Martínez et al.'s (1994) more diverse approach captures the entirety of the obstacles to U-I collaboration. That is, the conflicting objectives towards knowledge and technology production. Such incongruity originates from the nature of information disclosure, choice of research topics and long-term research orientation (Tartari, Salter, & D'Este, 2012). With governmental finances supporting scientific research, universities operate by a paradigm rooted in universalism, communalism and disinterestedness (Merton, 1973). Scientific inquiry has a wider public purpose, focusing on solving socio-economic and technological issues for the benefit of society.

In stark contrast, market forces dictate private companies' intent, pace and rewards. One's loss is the competitor's gain, i.e. a zero-sum game. Firms therefore behave with caution when processing new knowledge and appropriating its economic value (Teece, 1986). It is wise, in the private sector, to keep technological inventions and knowledge proprietary secret in the pursuit for profit and commercial outcomes. Whereas academia wish to publish and disseminate research instantly, industrial counterparts aspire to protect and temporarily hide technical progress in order to time the disclosure (Allen, 1984). This shines through in how the firm's timeframe for project initiation, test results and product creation runs asynchronously to the university's priorities for hastening the release of research to build merit (Hurmelinna, 2004).

A U-I technology transfer is thus surrounded by structural elements pointing in opposite directions with each participant ruled by adverse codes of values. This spurs a cultural barrier, a risk of misunderstandings and potentially mutual distrust, which the TTO has to address if not to jeopardize the collaboration.

Beyond the macro environment, U-I collaboration is also plagued with a high degree of uncertainty. Transferring innovation in this context implicates an integration of knowledge and technology from two heterogenic spheres with distinct knowledge bases and organizational anatomy (Asheim & Coenen, 2005). There is an inherent risk that the commercial application of the university's IP will disappoint and that bureaucracy and inflexibility dominate. The overall returns from the technology transfer may turn out insignificant and not justify the investment efforts (Cyert & Goodman, 1997).

Besides the probability of failing a product to market launch, the deviant knowledge bases further raise knowledge barriers. Previous literature have identified three contributing factors, including lack of absorptive capacity, causal ambiguity and arduous relationships (Cohen & Levinthal, 1990; Paulin & Suneson, 2012). The recipient's absorptive capacity culminates in the ability to recognize the value of new, external information, assimilate it and apply it to commercial ends. How the TTO chooses to translate the technical information of the university's IP decides whether the firm perceives any value.

Secondly, as knowledge is a multifarious phenomenon that moulds according to its environment, one must expect a degree of uncertainty in regards to how it interacts and responds to a transfer (Paulin & Suneson, 2012). Causal ambiguity may incite disagreement concerning research costs and distributional conflicts about the commercial benefits. It further invites different expectations to the university research, which can cause one party overvaluing the IP, while the other undervalues it (Clarysse, Wright, Lockett, Mustar, & Knockaert, 2007). The final factor claims that the level of accumulated experience within knowledge and technology transfers has a bearing on the resistance to share knowhow (Riege, 2007). Conditions where one side in the IOC is less familiar with the procedure and formalities may inspire concerns that the exploitation of the IP goes beyond what was initially intended. Insecurity might also arise with respect to loss of proprietary IP as consequence of poor attention to confidentiality and awareness of regulations associated with patentability (Hurmelinna, 2004).

Another significant aspect of barrier formation revolves around the personal level. Scientists and company representatives bring radically different mental models, formed by their structural context and institutional norms. The former seeks reputational gain through publications in top-tier journals and presentations at conferences as a critical path to career advancement (Siegel, Waldman, Atwater, & Link, 2003b). The field of interest typically follows topics valued by fellow scientists and the public, as these groups comprise their constituency. Research validation and peer recognition have first priority. Private employees, on the other hand, view their superior or senior management as key constituents. Subjects of interest are likely to concern valuable inputs to product and service development for customers (Nelson, 2004).

The type of language, terminology and incentives therefore beg to differ. This challenges communication, leading to misinterpretations, and complicates strategy alignment. The divide hinders relatedness, solidarity and trust between the actors, which is crucial for innovation (Powell, 1990; van Wijk, Jansen, & Lyles, 2008).

As the current literature demonstrates, there is an extensive coverage of how U-I collaboration barriers prevent frictionless technology transfers. However, there seems

to be a lack of theory development on how to combat these. The proximity school headed by the French scholars Bellet, Colletis and Lung (1993), presents a fruitful starting point, as innovation depends on the integration of knowledge through proximity. The concept has acquired a predominant position in the scientific literature explaining IOC (Sternberg, 1999) and currently enters innovation studies and organizational science (Knoben & Oerlemans, 2006). The framework has had multiple applications, but there is still space for using it to guide intermediary organizations such as TTOs and make it more accurate. This has spurred an interest to explore the existing theoretical perspectives on the matter.

4. Theoretical Framework

The bulk of theoretical studies about proximity has grown in substance since its inception two decades ago where it emerged from research in innovation networks (Rallet & Torre, 1999). Today, it offers a useful toolbox for understanding the coordination of economic activity, including innovation processes. New dimensions have added explanatory depth to the framework (Menzel, 2015) and it has empirically proven resistant when applied in comparative analyses across different geographies. Hardeman's et al. (2012) research on proximity dimensions' role in scientific collaboration in Europe and North America e.g. showed significant results. This gives confidence in that proximity theory lends itself suitable for a regional comparison of technology transfers via TTOs within Denmark and Sweden.

4.1. Proximity

Proximity theory argues that successful technology and knowledge transfer in IOC strongly relates to how proximate actors are (Mattes, 2012). That is, proximity is decisive for establishing common understanding and trust in an otherwise uncertain and high-risk transfer of innovation (Menzel, 2008). The concept is well suited for capturing the complexity of U-I commercial transfers of scientific knowledge thanks to its multiple interrelated dimensions. The current literature provides a wealth of proximity variants, including cognitive, organizational, institutional, social, geographical, technological and cultural (Boschma, 2005; Marrocu, Paci, & Usai, 2013; Cassi & Plunket, 2014). While

some of these dimensions partially overlap, this dissertation only takes into account cognitive, organizational, institutional and social proximity.

The four dimensions prove most relevant in the context of TTOs due to the nature of its core functions. Moreover, they are the most widely used and acknowledged in the literature on proximity. Several studies have stressed the relevance of these non-spatial dimensions, which may best be pictured as shared codification capabilities of knowledge (Nooteboom, Van Haverbeke, Duysters, Gilsing & van den Oord, 2007; Mattes, 2012; D'Este, Guy, & Iammarino, 2013).

The first three proximity dimensions form the foundation for the U-I collaboration while the social dimension fosters and reinforces the others as a facilitator for collaboration (Mattes, 2012). This does not entail social proximity carries less importance, but merely that it only can institute innovation-relevant bonding mechanisms (Mattes, 2012). Hence, there is a clear interrelationship among the different dimensions. Proximity theory suggests that those TTOs, which are able to master an appropriate level of proximity on all parameters, have a higher probability for successful technology transfer. Neither of the dimensions should therefore be analysed in isolation and perceived as fixed.

The respective proximities play out differently in accordance with the contextual settings, such as the type of technology transferred and characteristics of the actors (Villani, Rasmussen, & Grimaldi, 2017). Science-based firms such as those within biotech, pharma or infrastructure technology primarily have knowledge bases in which scientific knowledge is an integral resource. Engineering-based firms, on the other hand, rely mainly on knowledge bases in which innovations emerge in industrial settings. It is therefore common to see more frequent U-I interaction at the former rather than the latter (Asheim & Coenen, 2005). Science-based firms thereby tend to have stronger social relations (Balland, 2012) and have similar reference points (Knoben & Oerlemans, 2006). That is why the TTO ought to affect and customize the degree of U-I proximity to each company profile.

There exists no universal constellation of the proximity dimensions and as they operate dynamically throughout the entire technology transfer process, the TTO needs to constantly adapt and substitute the various forms of proximity (Mattes, 2012). The TTO can therefore narrow the distance in one dimension by creating proximities in the remaining (Menzel, 2008). This balancing act enables the TTO to reduce uncertainty associated with the U-I innovation transfer by alleviating issues of coordination between the two parties. As actors grow closer in proximity, it becomes easier for the TTO to facilitate interaction. However, one must be aware of the trade-off between innovativeness and greater proximity. Too much of the latter may be harmful to the technology transfer and scientific learning (Boschma, 2005).

To figure out exactly when optimal proximity occurs remains close to impossible. However, distinguishing theoretically between the different proximity dimensions serves as a strong starting point for understanding their constituent elements and for enhancing TTOs' innovation performance.

4.1.1 Cognitive Proximity

The cognitive dimension refers to what extent actors share similar knowledge bases and expertise (Nooteboom, 1999). Both of these pillars take root in experience from search processes and knowledge accumulation following the pursuit of innovation. Conditions such as organizational culture, routines, values and norms develop around such activities, which eventually determine the actors' absorptive capacity (Cohen & Levinthal, 1990). That is, the ability to recognize the value of new, external information, assimilate it and apply it to commercial ends. The ease of technology transfer may therefore depend on the resemblances between actors' knowledge bases (Lane & Lubatkin, 1998).

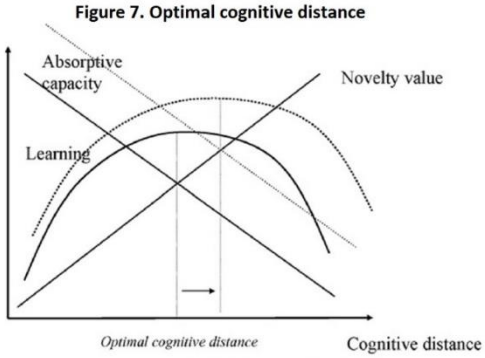
Collaborating parties who are cognitive distant find it harder to efficiently recognize and absorb knowledge originating externally as it is grounded in foreign principles and concepts (Rosenkopf & Almeida, 2003). Under such circumstances, it is vital the TTO identifies any kind of common frame of reference, as a minimum level of cognitive proximity is a prerequisite for collaboration to occur (Villani, Rasmussen, & Grimaldi, 2017). In order to realize this, proximity theory suggests TTOs to connect and adjust the

mental models of each player. That is, making their interpretation, sense making, categorization, inference and value judgements of their environment compatible to ensure mutual understanding (Denzau & North, 1994; Nooteboom, Van Haverbeke, Duysters, Gilsing & van den Oord, 2007).

If universities and industries share mental models, the TTO has managed to provoke similarities in specific knowledge areas, which function as platforms for a joint language (Denzau & North, 1994). This allows the TTO to mediate scientific communication and transfer knowledge effectively, which enables U-I interactive learning. As the university and industry engage with each other, their cognitive gap shrinks almost voluntarily and their knowledge complementarities alters (Cowan, Jonard, & Zimmermann, 2007). Their cognitive proximity increases in cases where the knowledge transfer expand the knowledge base of the recipient (industry) and where it becomes more alike the knowledge base of the university (Balland, Boschma, & Frenken, 2015).

Although cognitive proximity brings communicative benefits, TTOs must show caution. As previous indicated, too much proximity along any dimension may be inexpedient. According to Nooteboom (2000), it is advisable for TTOs to maintain some cognitive distance between the university and industry representatives for the sake of novelty and cognitive proximity for the sake of efficient absorption. This relationship often presents itself graphically as an inverted U-curve (see figure 7), describing the relation between cognitive distance and innovation performance. The TTO should therefore aim for the point of intersection between interactive learning and absorptive capacity to maximize novelty value.

Figure 7. Optimal cognitive distance



Source: Nooteboom et al., 2007. *Optimal cognitive distance and absorptive capacity*

4.1.2 Organizational Proximity

Organizational proximity is subject to a high degree of conceptual ambiguity as different scholars apply the term slightly modified (Knoben & Oerlemans, 2006). Torre and Rallet (2005: p. 50) coin it as actors who *"share the same system of representations, or set of beliefs, and the same knowledge*", which "*facilitates their ability to interact*". Oerlemans

and Meeus (2005: p. 94) approach it as "*actors that are close in organizational terms, belonging to the same space of relations*". Boschma (2005: p. 65) goes a step further by formulating it as "*the extent to which relations are shared in an organizational arrangement, either within or between organizations"*, which *"involves the rate of autonomy and the degree of control that can be exerted"* among actors.

Boschma's version offers a more narrow theoretical delimitation of the organizational proximity concept and thus makes it clearly separable from the other proximity forms. As this benefits the dissertation's analytical framework in terms of deducing findings, further reasoning uses this as the backbone for argumentation.

Organizations are organizationally proximate when there is an agreement on purpose, orientation, routines of behaviour, regulations and incentive schemes (Cassi & Plunket, 2014; Steinmo & Rasmussen, 2016). These elements construct the space of relations between actors, which is decisive for their ability to align expectations and attitudes towards the collaboration (Villani, Rasmussen, & Grimaldi, 2017). It therefore becomes key for TTOs to bridge any discrepancies in incentive structures and objectives to define common goals and prospects for the collaborative outcome. The path to organizational proximity can turn severely complicated in IOCs where each party belongs to vastly different organizational types as exemplified in a U-I public-private configuration. Considerable tensions may arise between academic and commercial logics, as the paradigms typically follow opposite preferences e.g. in regards to time constraints, competition and research disclosure (Bonaccorsi & Piccaluga, 1994; Ponds, van Oort, & Frenken, 2007).

In theory, the organizational distance is thereby high from the outset of any U-I interaction. In this situation, TTOs experience greater requirements to coordinate the technology and knowledge transfer, meaning that organizational proximity more closely relates to this single instance's resource capacity. Organizational proximity is a necessity for the TTO to keep opportunistic behaviour under control and for reducing uncertainty between the participants (Boschma, 2005). However, too much organizational proximity compromises flexibility in the commercialization process with risk of deterring new

initiatives and jeopardizing implementation of the innovation (Blanc & Sierra, 1999). The right balance of organizational proximity, on the contrary, inspires mutual confidence and thus relaxes the need for the TTO to safeguard formal contractual obligations. Conclusively, the TTO's ideal scenario is to nurture relational ties strong enough to avoid the need for excessive control, "red tape", while loose enough to secure organizational distance and autonomy.

4.1.3 Institutional Proximity

Institutional proximity emanates from the term "institution", which embraces a broad spectrum of features. For this reason, there is an issue of conceptual vagueness and ambiguity surrounding the institutional dimension. There remains little consensus on the meaning of the phenomenon in respect to organizations and how it influences innovation processes (Edquist & Johnson, 1997). It is thus of great importance to clarify the scope of the concept. Theorists that adhere to institutional theory perceive institutions as sociological meanings embodied in sets of values, norms, habits and established practices that govern economic behaviour (Edquist & Johnson, 1997). Others take a more pragmatic approach by thinking of institutions as tangibles in the form of rules and laws, which provide formal procedures (Marrocu, Paci, & Usai, 2013).

There is a rationale for resorting to pragmatism, as informal institutions i.e. cultural norms and values of conduct, own a more predominant role in the operation of intermediaries other than the TTO. The institutionalization of legislative measures and property rights receive prior interest in this dissertation. A desirable level of institutional proximity therefore corresponds to an effective collective institutional setup around the technology transfer (Marrocu, Paci, & Usai, 2013). In relation to this, TTOs perform two important activities. First step to achieve institutional proximity involves the effort of simplifying the legal bureaucracy as much as possible through standardization of contractual forms. The expectation is a drop in legal conflicts and enhanced reliability with positive impact on transaction costs and uncertainty (Boschma, 2005).

It is also critical to what extent the TTO mediate the legal content sufficiently as to ensure coherence between the political framework and the laws applying at organizational level. As the technology transfer progresses through its stages, the TTO

does wise in adjusting its position continuously towards the actors regarding communication and advice to foster institutional proximity (Balland, Boschma, & Frenken, 2015). Doing so promotes transparency and clear integration of common rules and legal commitments, which stimulates the coordination between the actors (Mattes, 2012).

4.1.4 Social Proximity

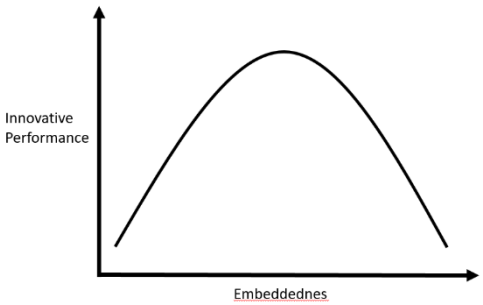
Social proximity stems from the embeddedness literature advocated by Granovetter (1985), which accentuates that economic relations and knowledge relationships permanently reside in social contexts. These social constructs rest on trust based on friendship and experience that determine the space for social relations. Social relations in turn influence the outcomes of interactions (Hardeman, Frenken, Nomaler, & Wal, 2015). Social proximity thus denotes the extent to which actors share common relationships because of similar personal characteristics, past personal interaction together with a sense of familiarity. Certain scholars therefore sometimes refer to social proximity as personal proximity (Schamp, Rentmeister, & Lo, 2004) or relational proximity (Coenen, Moodysson, & Asheim, 2004). The point of reference for this dissertation, however, remains social proximity and indicates whether actors belong to and share the same network of relations.

Since social ties and trust are central to social proximity, it is critical actors have had personal acquaintance and emotional closeness in order to create reciprocity (Huber, 2012). The emergence of interpersonal relations between independent individuals thereby receive main priority when analysing the dynamics of social proximity. In the context of U-I technology transfer, the TTO's ability to operate as a gatekeeper, linking different actors, and to stimulate a collaborative environment based on social closeness will have pride of place. Social nearness facilitates the capacity to learn, absorb external knowledge and innovate through trust and decreases transaction costs (Marrocu, Paci, & Usai, 2013). This may be severely complicated in U-I IOCs where actors operate with separate mind-sets and paradigms. In this case, social proximity is of even greater importance to not only support coordination of transactions, but also act as a vehicle for knowledge transfer and resource mobilization (Knoben & Oerlemans, 2006).

Social proximity invigorate commitment with potential benefits for further collaborative agreements and hampers opportunism as opportunistic behaviour causes reputational loss (Dasgupta & David, 1994). Trust-based relations also encourages communicative openness and positive attitudes, rather than a calculative and utility maximization orientation towards cost minimization (Lundvall, 1993). The core intention behind improving social proximity of academics and industrial partners is to provide the prerequisite for technology transfer and interactive learning.

As the other types of proximity, it is a balance between too much and too little. An unhealthy level of social coherence can lead parties to group think, locking them into established best practice at the expense of innovative inputs (Grabher & Ibert, 2006). In the latter case, lack of trust and commitment can also be destructive for innovation performance. The aim ought to be the ideal position at the summit of the curve pictured in figure 8 on the right. Doing so will keep actors alert, open-minded and flexible to the support of the IOC (Boschma, 2005).

Figure 8. Relational Embeddedness



Source: Boschma, Lambooy, Schutjens, 2002, *Embeddedness and innovation*

4.2 Definitions & Operationalization

The following section frames my understanding of the concepts central to the research question. It further explains how I operationalize these into qualitative items, while justifying the choices for analysis. Informants where asked questions on how they perceived the respective proximity items, which proved most relevant in the literature and to the function of the TTO.

4.2.1 Innovation Intermediary

This dissertation follows Howell's (2006, p. 720) definition of an intermediary as "*an organization body that act as an agent or broker in any aspect of the innovation process between two or more parties*". Such definition entails that the intermediary assists in supplying information about potential collaborators i.e. in the TTO's case to the scientist. It further means the intermediary act as a mediator between both organizational bodies

(university and industry) and provide advice and support for the innovation outcome (Howells, 2006).

The intermediary reduces universities' search costs, bargaining costs and transaction costs by scouting the right partners, engaging in negotiations and mitigating incentive misalignment (Kodama, 2008). In relation to this, the intermediary is responsible for facilitating communication of scientific knowledge and transfer technology from one domain to another for application. As part of this role, the intermediary represent the perceptions and expectations of both constituents (Wright, Clarysse, Lockett, & Knockaert, 2008). This is the case regardless of the intermediary being internal or external to the university, the TTO being an example of the former. What defines an intermediary is rather the activities it performs than its organizational characteristics. Those activities support the primary goal of breaking down U-I collaboration barriers to pave the way for proximity.

4.2.2 Operationalizing Proximity

Following Mattes (2012) argumentation, proximity implies commonalities, which go beyond similarity, but does not suggest sameness or homogeneity. University and industry actors therefore have to possess certain fundamental points of resemblance, however, simultaneously maintain a degree of complementarity in order to become optimally proximate. For analytical reasons, it is essential to clarify the definitions of each proximity dimension as to avoid misleading overlaps and to substantiate how each type can be analysed.

4.2.2.1 How to Analyse Cognitive Proximity

Cognitive proximity commonly defines how actors perceive, evaluate, interpret and understand their surrounding environment (Wuyts, Colombo, Dutta, & Nooteboom, 2005). There is therefore an intent to investigate to what extent the TTO can compensate for the cognitive biases of the university scientist and company representative and unite them around a joint purpose. To uncover this, this dissertation operationalizes cognitive proximity using four items: scientific scouting, scientific knowledge gaps, scientific communication and unanimity on the commercial value of the IP. The following paragraphs explain the four items one by one.

Regarding scientific scouting, university scientists can be a vital source of competences for the company and its competitive advantage, but not all of them possess a skillset compatible with the company's capabilities. It is neither obvious which scientist's IP fulfil the exact need of the firm. It is thus to be expected that firms are unaware of where to find the best match. The intention is to unravel whether the TTO is capable of leveraging its knowledge of researchers operating in internal departments within the university and relevant company activities to scout university-patented discoveries of interest to industry to build effective collaboration.

The second cognitive item that will be used in this dissertation is the degree to which the TTO can connect the academic's and firm's knowledge gaps. It is essential for the technology transfer to combine the right bundle of inherited knowledge resources from both sides in order to maximize the outcome. To succeed in this requires deep insights of the industrial and academic knowledge bases. The question is whether the TTO's staff has the necessary technical background to grasp the specificity of the field around the scientific discovery and help compose the pieces of knowhow from academia and industry.

Scientific communication constitutes the third item because an appropriate scientific discourse establishes a standpoint for creating mutual understanding. Awareness of language differences is key in this connection, meaning that it is of interest to see how prevalent those are and whether the TTO manages to use terms, which resonate with both the scientist and industrial communities. It is further of interest to observe if the TTO can articulate the opinions of each player in a fashion that encourages obliging behaviour.

Unanimity on the commercial value of the IP represent the final item of cognitive proximity. The ease at which both parties reach an agreement on the future market prospects for the IP shows whether it has been possible for the TTO to create a common ground for interpreting and evaluating the elements of the research.

4.2.2.2 How to Analyse Organizational Proximity

Organizational proximity defines the degree to which the participants follow similar organizational logics and structures (Mattes, 2012). The concept deploys between organizations either connected by an economic relationship or financial (inter)dependence (Kirat & Lung, 1999). Against such starting point, this dissertation operationalizes organizational proximity using the following five items: control of opportunism, operational flexibility, expectation management, incentive structures and human resource capacity.

Regarding the first item, given the many unknowns accompanied with the technology transfer, it is almost impossible to predict the subsequent implications for the commercialization of the IP. This may result in one actor appropriating the benefits of the technology transfer at the expense of the other. As both sides share commercially sensitive intelligence, the situation could be very negative. Therefore, it is important to examine to what extent opportunistic behaviour occurs and how proficiently the TTO controls it.

Operational flexibility is the second item. It signals the extent of leeway both actors have in regards to applying the IP according to their own preferences. As the technology transfer is partly under public management (the university), there may be certain strings attached to the licensing agreement due to the university's legal obligations. It is therefore of interest to find out the extent of bureaucracy or "red tape" restricting the implementation of the IP and how the TTO is able to provide a flexible framework.

Thirdly, this dissertation examines expectation management. The expectations in regards to the output and returns from the commercialization of the IP may very well vary. Both the university and the firm enters the technology transfer process with an eye for a certain outcome and economic gain. However, the former may be more interested in seeing national growth, job creation and achieve a financial return that can sustain its scientific research. The latter may consider it an opportunity to build a long-term competitive advantage, market share and improve the bottom line. It is thus analytically relevant to investigate what challenges arise when the TTO adjusts and bridges such marked differences in expectations.

As U-I organizational logics and goals can be contradicting, they might complicate the technology transfer process significantly. In order to narrow the divide, it is important that each player knows the requirements, objectives and incentive structures of the counterpart. This dissertation aims at studying how severe an obstacle the opposite logics are and how well the TTO reconciles them.

Lastly, the fifth item is about the TTO's human resource capacity. Without adequate TTO staff resources and expertise, the scientist and the company may experience significant delays in the technology transfer process, which in worst-case scenario can postpone or terminate the IOC. The question is whether the TTO has the necessary breadth and depth of human capital to fulfil these tasks.

4.2.2.3 How to Analyse Institutional Proximity

The similarity of informal constraints and formal laws and rules define the degree of institutional proximity (North, 1991). That is, institutions define organizations' choice set; meaning the resemblance between their institutional formats decides the difficulty of coordinating (Kirat & Lung, 1999). Institutional proximity thus operationalizes using these five items: mediation of regulative structure, legal advice, IP ownership, IP enforcement and legal conflicts.

The regulative structure supporting the technology transfer can seem complex and problematic for the agents to transmit to their local context. The legal content can be of a completely different sort than the customary and thus create discord. This makes intermediary mediation paramount. The aim of the analysis is therefore to inquire whether the TTO can formulate concise enough contractual clauses and readily explain them to leave as little confusion as possible.

The technology transfer follows through a series of stages, which creates the need for modifications of advisory. The scientist most likely seeks legal advice on how to design the patent; e.g. in terms of geographical coverage and duration before moving to the interface with the industrial partner, where inputs on terms and conditions typically dominate. The company representative may initially ask for details on how procedures run when engaging with a public actor and what, if any, restrictions apply during the

licensing tenure. The intention is thus to discover how the TTO provides sufficient legal advice and if the service is versatile enough.

During negotiations, the TTO has to take into consideration the university's and professor's ownership of the IP. It is in the university's and scientist's interest that the TTO leverages the IP ownership to their favour. However, the TTO ought to be careful not to offend the private actor. A fair deal for both sides circumvents antagonism and shows professionalism. The query is then how the TTO handles this pressure and balances the negotiation.

IP enforcement is of primary importance when engaging in innovation activities as exclusive rights to the inventor ensure protection of the invention (Lanjouw & Lerner, 1997). Proper patent litigation is a prerequisite for an effective IP system, but can quickly become costly and drag on (Lanjouw & Schankerman, 2001). Mediation, on the contrary, incurs fewer expenses and may have the same effect on dissolving disputes. The query is to what extent the TTO is able to defend the IP in a manner that limits the transaction cost and inspires confidence with the licenser and licensee.

Legal conflicts always pose a threat to contractual relationships; in particular, where collaborators arrive from separate regulatory systems. Standardization of contracts and guidelines can bring clarity and credibility to the legal matters. This might neutralize any attempt to criticize and discuss the objectivity of the decision-making process. It is consequently of importance to examine if the TTO understands how to take the right precautions to mitigate potential controversies and infringements.

4.2.2.4 How to Analyse Social Proximity

Social proximity defines the degree of embeddedness of personal relationships between actors' social networks, concerning trust, friendships and collaboration experience (Balland, Boschma, & Frenken, 2015). That is, the definition excludes any circumstances where representatives share sets of values such as ethnic or religious. According to this, this dissertation operationalizes social proximity using the following three items: degree of mutual trust, state of collaborative environment and engagement in social events.

Trust permeates every aspect of the technology transfer and depends on factors such as sympathy, likability and personal disposition for trust. It denotes the belief that the other part in the collaboration behave in accordance with one's expectations and makes guarantees and juridical enforcement somewhat redundant (Gössling, 2004). In its absence, actors will not be fully committed, due to uncertainty about fair and consistent treatment if problems emerge (McEvily, Perrone, & Zaheer, 2003). As social nearness breads trust, the analysis will be attentive to how the TTO mediates trust building.

The atmosphere of the collaborative environment determines whether partners will approach each other in an open dialogue or one characterized by utility maximization. In the latter case, everyone is cautious of sharing delicate information as the counterpart might use it at his or her disadvantage. The question is what initiatives the TTO takes and how much it contributes to generate the former.

If each party stays closed within their own community, incomprehension in the IOC increases gradually. Frequent personal interaction, in contrast, most likely broadens the viewpoints of the actors and inspires them to become more open-minded to unfamiliar perspectives. Fora such as workshops, conferences and fairs offer platforms for that to happen. The analysis hence devotes attention to the TTOs capacity to increase repetitive contact between collaborators to promote greater and more effective social interaction.

To summarize, box 1 below displays the items operationalizing TTO's management of proximity between the university and industry within all four dimensions.

Box 1: Summary of items operationalizing TTO's proximity management

Cognitive Proximity	Organizational Proximity
• TTO's scientific scouting • TTO's bridging of scientific knowledge gaps • TTO's scientific communication • TTO's bridging of views on the IP's commercial value	• TTO's control of opportunism • TTO's provision of operational flexibility • TTO's expectation management • TTO's bridging of incentive structures • TTO's human resource capacity
Institutional Proximity	**Social Proximity**
• TTO's mediation of regulative structures • TTO's legal advice • TTO's balancing of IP ownerships • TTO's IP enforcement • TTO's mitigation of legal conflicts	• TTO's mediation of trust building • TTO's mediation of collaborative environment • TTO's capacity to promote effective social interaction

5. Methodology

The research question in this dissertation warrants a qualitative study, due to its explorative character. In that respect, the methodological setup is best suitable for a deductive approach, assessing theory against in depth interviews. The dissertation builds from a cross-country comparative case study of the TTO's function as an innovation intermediary in Denmark and Sweden, respectively. The level of analysis plays out from the organizational perspective of the TTO with references to its relationship with stakeholders in the immediate inter-organizational network. The units of analysis constitute individuals working within the TTO, while academic and company representatives supplement as interview respondents. The methodological structure of the dissertation thus favours a comparative design.

5.1. Comparative Method

The comparative method involves an analysis of thickly descriptive narratives across a relative small number of cases (Moses & Knutsen, 2012). The discipline attempts to establish contexts within which meaning situates between a minimum of two cases in order to construct patterns of social reality. The method thus lends itself as a tool to uncover plural empirical perspectives among subjects, rather than one for measurement (Lijphart, 1971). One should consider the comparative research strategy when the intention is to decipher the complexity of the case to improve understanding while keeping a window open for some level of generalization (Ragin, 1987). Case selection does not take place randomly, but follows a clear justification. The comparative method points out cases as a control measure to test arguments about social regularities (Moses & Knutsen, 2012). This tallies well with this dissertation's research design, drawing on observations from a minor and carefully picked parallel group of cases.

The method's goal is to demonstrate whether certain frameworks, models or concepts can shed further light on the selected cases (Skocpol & Somers, 1980). The intent, however, is not to test the validity of the theory at hand, but more to highlight potential contrasts and similarities among cases (Collier, 1993). This allows for interpretation of how processes of social phenomena differ in various contexts. In-depth research has

priority in this case-oriented project rather than generalizations beyond the scope of the study.

Several scholars within the social sciences have attempted to develop an accurate label for the comparative method. The literature provides references such as comparable case strategies (Lijphart, 1975), most different system and most similar system designs (Przeworski & Teune, 1970), focused comparison (Hague, Harrop, & Breslin, 1998), case-oriented comparison (Ragin, 1987) and the method of systematic comparative illustration (Smelser, 1973). To avoid further confusion, this dissertation returns to a scholar, who was among the early contributors. He offered one of the first systematic descriptions of the comparative method, which still resonates in the contemporary comparative method.

John Stuart Mill mapped out four different comparative methods: the method of difference, the method of agreement, the indirect method of difference and the method of concomitant variation (Moses & Knutsen, 2012). All of them have their roots in the natural sciences, but later saw application on social phenomena. One must therefore show caution when utilizing either of the methods. Nonetheless, this dissertation sees fit to apply the method of difference, considering the unique discrepancy in respect to IP ownership in Denmark and Sweden.

5.1.1 The Method of Difference

The dissertation takes inspiration from the mechanics behind the method of difference, which mirrors the logical design of an experiment. The method compares instances, which have every circumstance in common except one phenomenon (Mill, 2002). In this occasion, the institutional IP ownership in Denmark and the professor's privilege in Sweden exemplifies this deviance. Both cases share characteristics as a mean for effective control and as a way to accentuate the deviant factor. Any parameter that has potential to be of relevance is under scrutiny. The intent is to detect a pattern where one of the items closely associates with the subject matter, while the influence from the remaining relevant items are somewhat stable.

Figure 9 visualizes the comparative format, contrasting cases in which the phenomenon of interest is present against (negative) cases in which it is absent. In other aspects, the cases are as identical as possible. The "x" character corresponds to the phenomenon under examination.

Figure 9. Method of Difference

Positive Case(s)	Negative case(s)	
a	a	Overall similarities
b	b	
c	c	
x	not x	Crucial difference
y	not y	

Source: Skockpol & Somers, 1980, *The Use of Comparative History in Macrosocial Inquiry*

Social scientists typically employ the method in four disparate ways: longitudinal, i.e. comparisons over time, within nations, across areas and with counterfactuals (Moses & Knutsen, 2012). The third application reflects the reality in this dissertation, where the investigator strives to control contextual parameters by finding a pair of relatively analogous nation states. It is thus reasonable to assess the challenges the TTO experience in bridging the university and industry in Denmark and Sweden, as the polities are similar enough to honour Mill's condition for activating the method of difference. Work from other comparativists on Area Studies and its long record brings credence to this argument and confidence in the applicability on a comparative case study analysis (Alagappa, 1995; Diamond, 2010).

5.1.2 Case Study Analysis

The case study model positions itself at one end of the continuum relative to the small-N analysis and the statistical analysis by investigating a single unique case (Abbott, 2004). Researchers choosing this ground aim to increase understanding by diving into an intensive study to retain as rich information as possible. Two general case study formats exist, the didactical and theory-anchored (Moses & Knutsen, 2012). The former is interested in the "how" of the case, which is in line with this dissertation's research question. The latter is concerned about the "why" and seeks to generalize from a case singled out from a relatively large sample (Lijphart, 1971). The didactical approach therefore serves a better choice as it springs from an empirical curiosity and seeks to illustrate the case's detailed features.

It is further helpful to clarify what case study subcategory into which the inquiry falls. Several scholars have mapped different typologies (Eckstein, 1975; Yin, 1993; Stake 1995), however, Lijphart's (1971: 691) six ideal types: atheoretical, interpretive, hypothesis-generating, theory-confirming, theory infirming and deviant case studies form a useful continuum ranging from descriptive to theoretical. Out of these variants, the interpretive study suits the anatomy of this dissertation. Unlike the atheoretical sibling, which has a sole interest in the case per se, the interpretive study makes explicit use of theoretical propositions to guide examination and interpretation (Kaarbo & Beasley, 1999). While the empirics may throw light on the applicability of the theory on the case, there is no agenda for improving theoretical generalization.

However, qualitative generalization applies to the specific case by leveraging the facts derived from the dissertation's semi-structured interviews to another case (Kennedy, 1979). The comparative case structure produce a more robust understanding of the inquiry and insights for other studies of how TTO attempts to develop U-I proximity. One has to bear in mind though; it is by imposing a pattern on meaning onto the cases rather than inferring from the interpretive case studies (Flyvbjerg, 2001). Hence, there is a possibility for the analyst to suggest mechanisms for changes to effect on a particular organization (TTO), institution or actor that is the subject of the cases (Kaarbo & Beasley, 1999).

5.2 Case Selection

In order to strengthen the comparative design, this dissertation endeavoured to select comparable cases with as parallel characteristics as possible. The TTOs at UoC and LU employ almost the same amount people, receive similar volumes of inventions and patent applications (Styrelsen for Forskning & Innovation, 2016; University of Copenhagen, 2017; Lund Innovation, 2017; Lund University System Office, 2016). The universities are nearly equal in size in terms of total number of students, scientists and faculties (Københavns Universitet, 2017; Lund University, 2017). Table 1 in Appendix 1 summarizes the key traits of the two cases.

The regional demographics of greater Copenhagen and Scania are comparable as well. The regions have related sector activity, similar amounts of R&D expenses and number

of people working on research in natural sciences (Medicon Valley Alliance, 2016). Both regions see frequent interaction between universities and industries and have a strong focus on Life Science and biotechnology. The research design also benefits from the fact that each country is domestically consistent with respect to regulations of university IPR. Legal amendments affect all academic research, unmodified by internal country variations e.g. between private and public universities or variations at lower levels of government (Valentin & Jensen, 2007). Historically, both regimes have followed matching legal trajectories in regards to IP ownership from the 1950s until 2000, where Denmark abolished the inventor ownership as opposed to Sweden.

Such similar regional and institutional contexts reduce the issue of contextual biases, when investigating the activities of the two TTOs. It further allows a general assumption following the difference in legal frameworks about university IP ownership. As the professor's privilege, valid in Sweden, dictates that the IP belongs to the university scientist, the Swedish TTO will presumably experience greater difficulties in finding a subtle balance between what the university can and cannot legally facilitate in the technology transfer process. The university delivers the facilities for the scientist to conduct research, but cannot claim the IP. Hence, this dissertation's assumption posits that Swedish TTOs will experience greater challenges in managing proximity compared to Danish TTOs.

5.3 Data Collection

The primary data collection adheres to the technique of purposive sampling, by carefully selecting respondents based on their qualifications for answering the dissertations' research question (Teddlie & Yu, 2007). The main criteria was that informants had to play a central role in the decision-making process around the U-I technology transfer and be knowledgeable about the subject at hand (Schutt, 2012). Thereby, it would be possible to enhance the chances for maximizing the inputs from a relatively few sources. Referrals from the TTOs became a stepping-stone for localizing other informants with valuable information. The total empirical base mounted to 12 interviews, six in each country. Each group of interviewees counted two TTO employees, two scientists and

two industry representatives. Table 2 in Appendix 1 provides an overview of the respondents, whom the dissertation will reference as R1, R2, R3, R4, etc.

The strategy of using multiple sourcing paved the way for data triangulation to combat systemic biases and allow for cross-examination of responses (Anney, 2014). Such practice establishes credibility and strengthens confirmability of the qualitative research. It also ensures it is the respondents and conditions of the inquiry that determine the results and whether other independent researchers can corroborate the findings (Lincoln & Guba; Baxter & Eyles, 1997).

It was possible to involve TTO employees with a legal and commercial background to enrich and diversify answers and find scientists and tradesmen of similar seniority and profession in both geographies. Successful duplication of this sampling technique enhances comparability across the two different cases and the ability to contrast the institutional proximity dimension in particular (Teddlie & Yu, 2007). Each type of respondent received a unique interview protocol with questions mirrored in the proximity dimensions, but adjusted to their context.

The majority of the interviewees gave their consent to record the interviews, which took place on the respondent's premises. The rest occurred via communication media, such as Skype and phone, while noting down comments. The interviews lasted in the range of 30 minutes to an hour and promised to be anonymous. To honour this, the dissertation uses codes to preserve anonymity of the people and treats the data in the same manner.

5.4. Data Treatment

The data was treated and organized in line with grounded theory advocated by Strauss and Corbin (1998). That is, the approach has been to categorize the interview content and code it inductively with the purpose of identifying relationships and themes. Following a transcription of the interviews, the analysis proceeded in Microsoft Excel by manually listing relevant quotes and translating them to first- and second-order codes (Gioia, Corley, & Hamilton, 2013).

There are several types of first-order coding methods available. However, with an explorative research question striving to study the realities of the respondents, In-Vivo coding appeared most appropriate as it honours and prioritizes the respondents' voices (Saldaña, 2009). In-Vivo codes derive directly from the terms of the actors in their field, i.e. incorporating the informants' own language in the analysis. This protects the meaning of their views and actions and helps the investigator to access behaviours and processes to understand how they solve problems (Strauss, 1987; Charmaz, 2006).

In practice, a code takes the form of either a word, short phrase or sentence that encapsulates the essence or features of each data (Saldaña, 2009). The approach is then to cluster the In-Vivo codes according to similarities and regularities of the lived experiences of respondents to facilitate the development of the analysis. The In Vivo codes not only represent aggregated themes, but also a range of a property that can lead to associated theoretical codes (Saldaña, 2009). This makes the method compatible with proximity theory.

The second-order coding refers to researcher-centric theoretical concepts and dimensions (Gioia, Corley, & Hamilton, 2013). During this step, the dissertation relates the In Vivo codes to the respective proximity dimension. The tandem reporting of informant and researcher statements, allows a transparent demonstration of the links between the raw data and theory (Gioia, Corley, & Hamilton, 2013). One can check whether the investigator has managed to condense what is of significance to respondents. The overall purpose is to gain a thorough understanding of what respondents find meaningful, which is in accordance with the dissertation's philosophical standpoint.

5.5 Constructivism

Certain commitments come into force when adhering to the constructivist tradition, in regards to worldview and pattern revelation. As formulated by Fierke (2004: 36) "*methodology refers to those basic assumptions about the world we study, which are prior to the specific techniques adopted by the scholar undertaking research*". The constructivist methodology provides a structure for pondering on the nature of social life and interaction (Parsons, 2013) and allows the observer and society a central role in

studying the world in contrast to other philosophical stands. Contextualism and social constructs, i.e. interpretive filters humans use to perceive, think and feel, matter for scientific enterprise (Parsons, 2013). Contingency rather than determinism govern argumentation in this dissertation, meaning what the investigator believes about the world will colour the research activities and findings. Thus, this project implicitly adopts a particular ontological position on how social phenomena exist (Klakegg, 2015).

5.5.1 Adopting a Social Ontology

Ontology denotes the methodological assumptions about access to reality, which in constructivism is subject to and constructed by each agent's unique sense perception (Moses & Knutsen, 2012). There are therefore multiple realities, which stresses the necessity to examine the details of actors' situation to comprehend the reality operating behind them (Remenyi, Williams, Money, & Swartz, 1998). The dissertation uses the constructivist methodology to analyse the cases of TTOs, including TTO staff, university scientists and industry representatives because it allows for research built on their assumptions about the construct of social reality (Pouliot, 2007).

The informants do not merely observe the surrounding environment, but participate actively in forming it. Every agent is inevitably involved in negotiations with the subjects under study, which on their own are meaning creating beings (Fierke, 2004). The human capacity to reflect and learn influences how actors ascribe meanings to the material world and how they frame, experience and understand it cognitively (Adler, 1997). The dissertation hence refrains from imposing categorizations in order to deliver an accurate representation of rules governing the practices and institutions of which the subjects submit. Such diverse ontological assumptions open equivalently for various epistemological commitments about what can and cannot be true about social phenomena (Klakegg, 2015).

5.5.2 A Positivist Epistemology within a Constructivist Mind-set

This dissertation embraces an epistemology in tune with positivism and thereby draws on a naturalistic version of constructivism (Wendt, 1999). This means the investigator can generate acceptable knowledge through sensual perceptions such as observations and direct experiences. It is possible to try identifying associations between social

phenomena through analytical methods, seeking to uncover patterns of regularities. The product of research can be “law-like generalizations”. However, as observations are theory-dependent, facts ought not to be deterministic and one should restrict oneself to describe them and demonstrate their regular appearance (Moses & Knutsen, 2012). Positivism permits data collection from in-depth interviews, while applying existing theory to empirics (Saunders, Lewis, & Thornhill, 2009).

6. Analysis

In the spirit of the comparative research strategy and the method of difference, the analysis commences the case study analysis of the TTOs at UoC and LU, respectively. The section starts presenting the findings in each country separately. Subsequently, a comparative set-up concisely assembles the results to accentuate potential similarities and discrepancies between the two TTOs proximity management.

6.1 Findings

6.1.1 Managing Cognitive Proximity in Greater Copenhagen

The TTO utilizes invention disclosure forms, to uncover current collaborations or potential industry contacts by the scientists, and own network as a first step to scout firms (R1). This has substance as the TTO officers carry hybrid backgrounds, i.e. work experience from academia and industry.

“Utilizing the existing network is what it is all about, as the majority of us come from the industry either biotech or other kinds of domains.” (R1)

This enables estimations of whether the licensee’s capabilities compliment the scientist’s and the extent to which the former understands how to absorb the technology. In case the TTO’s and scientists’ network does not suffice, methods such as news investigations offer an alternative route (R1). The objective of this exercise is to map activity in the respective technology field to unravel the scope for the IP (R1). Such path gives the TTO worse odds for identifying an optimal industrial entry point. This increases the probability for engaging with cognitive distant partners and intensifies the challenge of bridging mental models. To avoid this, the TTO has to conduct field research and systematize stakeholder networks, which seems unattainable.

"We have previously had a more systematic scouting process, where we actively went out in the field and looked for relevant technologies." (R2)

The TTO also has to keep an overview of what the scientists potter at in case a company makes contact. The TTO therefore participates in university courses and gatherings to be visible to the scientists and enlighten them about the opportunities accompanying commercialization.

"The scientists have to go through the mandatory course, Responsible Conduct of Research, where we have been allocated an hour to explain the rules." (R2)

In the same vein, the TTO gains an insight into the scientists' projects and an option to influence their mind-sets. This prepares the scientists for the interface with practitioners, improving their conditions for interpreting and making sense of proposals from the latter. Overall, it appears that internal scouting of scientists receives greater focus than external scouting of industry players. The scientists agree the scouting process has been one-sided, but disagree on the reason why.

"The TTO does not have the time, the competencies nor the necessary network to fulfil the scouting activities" (R3)

These perspectives indicate the TTO leans towards the university field because of difficulties in living up to its mandate. This forces the corporations to compose the match (R3). To turn the situation around, the TTO have to attract people from organizational tiers, who have had a larger surface of contact in the industry (R4). One firm partly confirms this, as its contact with the scientist came in place without the TTO. The firm takes the initiative to bring the IP further, while the TTO acquires a supportive function.

"We came in contact with the scientist ourselves. We have an agreement with the TTO, if there is anything that borders to anything we do, they make contact." (R5)

The TTO adopted a leading role in the second case, operating as an "*outwards searching market place*" and "*managed to make a good match*" (R6). This implies proper anchoring in the industrial organization and proves an ability to filter relevant scientist profiles.

"In those instances, we have continued with the IP, the scientist's skillset has provided our company value." (R6)

There are opposing views on the challenges the TTO faces when performing scientific scouting. Unanimity is neither the case, when connecting scientific knowledge gaps. The response from the TTO emphasizes the outcome is firstly contingent on the type of fields the industry and university derive from (R1). This indicates occasions where the parties' knowledge composition deviates to an extent where complications arise. An officer confirms this by stating, "*It is not always the cooperation is completely fluent*" (R2).

The TTO also finds it important to distinguish between types of university research, as knowledge gap bridging secondly depends on the research's purpose. In some instances, the technology transfer involves fundamental research meant for knowledge production and applied research for development in others (R1). As the firms are motivated to shorten the distance from idea to market, there is a push for the latter.

"The company's premise is to earn money and to get a product on the market. Our scientists' premise is completely different: namely to create new knowledge and those two things sometimes clashes." (R2)

Since the university scientists frequently practice fundamental research, the constituent parts of their knowledge base is intrinsically different. The firms may only understand a fraction of the fundamental knowledge, making it insufficient for commercial ends. A low degree of absorptive capacity complicates efforts for bridging cognitive breaches, thus testing the TTO on resolving such market failure. According to the TTO, however, it is incorrect to anticipate this being the rule rather than the exception.

"It is not with certainty you can say the knowledge bases of the university and industry are completely different from each other." (R1)

Certainty aside, the scientists express concerns in situations where the knowledge bases differ. There seems to be a degree of uncertainty of whether the TTO can locate suitable knowledge resources and facilitate effective combinations of them. Bridging the knowledge gaps with the firm requires a footing in academia and industry without which synergies between knowledge bases is impossible (R3). This appears to be more of a coincidence, as there is not yet a "*natural cycle where the experienced people join the TTO*" (R3). If this accurately depicts the reality, perhaps it is worth asking what has to change to incentivize the right people. The disincentives may be many, but one points

towards the restriction on labour mobility of the TTO officers, as "*they are not allowed to move to the firms they think are interesting"* (R3). Another deterrent may be the job content (R4), which inspires considerations on whether the TTO is subject to substantial administrative tasks that removes focus from valuable activities.

The industrial partners left a contrasting image as neither mentioned difficulties with how the TTO facilitated the process of piecing the knowledge bases together. There appears to have been an effective mediation, despite the inherent information asymmetries.

"It is my impression they (TTO) have had the necessary meetings on a continuous basis and found out what the IP can be used for." (R5)

During the U-I interface the knowledge complementarities altered, thus expanding the knowledge base of the firm and increasing cognitive proximity. The resemblance between the two knowledge bases pave the way for commercial exploitation, as is the case for the second firm; however, with the exception of almost identical knowledge bases prior to the technology transfer (R6).

The resemblance of knowledge bases determine the conditions for facilitating the U-I scientific communication. Without shared mental models, there will be language barriers. The TTO has mixed experiences, depending on the company's size, age and past records of license agreements. Smaller companies with a weak history of license negotiations with the university are not on the same wavelengths (R1). In order to connect the disparate discourses, it is necessary to address the firm at both the leadership and scientific level (R2). The TTO devotes greater attention to the management team, as the university and industry scientists more easily find a joint terminology driven by an excitement around the technology (R2).

Scientific communication becomes subordinate when the TTO engages in negotiations with larger corporations. Disputes over technology pricing and the content of the deal dominate rather than language use (R1). Such circumstances reduce the need for provoking similarities in knowledge areas and leverage them as communication platforms to foster mutual understanding.

The feedback from the scientists takes two contradicting positions. In one instance, the TTO keeps a fruitful scientific dialogue throughout the whole process when navigating between negotiation sessions (R3). This signifies an attentiveness towards mediation of the scientist's opinions in a sound manner. In the latter case, the scientific consultations initially face poor odds due to the TTO's unfamiliarity with the technology field, but fine-tuned over time (R4).

Such learning curves negatively affect the transfer of knowledge and disable U-I interactive learning to the detriment for cognitive proximity. A firm's statement hints at this as the TTO leans against the scientist for inputs (R5). Scientific conversations therefore comes to a hold when debating details of how to take the IP forward (R5). There is concurrently an acknowledgement of a natural limit for the scope and depth of the expertise the TTO can contain across industries (R5). Comments from the second firm show no indication of communicative misalignments. It is though necessary to view the reply in the light of the fact that the firm sees no need for a translation of the scientific content thanks to a solid research background (R6).

The previous three items shape the foundation for creating a common ground for bringing forth the IP's commercial value. The industry brings fundamentally different assumptions about the prospects for the IP, complicating evaluations substantially. The TTO again highlights the difficulty in making ends meet when dealing with an industrial beginner within university licensing in contrast to larger pharma corporations (R1). Well-documented processes and proven technology forecasting models in the latter firm category deliver transparency around pricing estimates. Despite the availability of such means, disputes yet remain with respect to the value attributions of the IP (R2). To circumvent gridlock, the TTO resorts to a commercialization strategy that endeavours to alleviate unfair risk distribution at the expense of the firm.

"Our commercialization strategy is based on backloaded license agreements, meaning that the when the firm earns money, we earn money. It is usually something that resonates well the firm as they think it is a more fair distribution of the risk." (R2)

At the other side of the table, the TTO experiences that certain scientists struggle to comprehend the amount of further investments and development the invention

requires before the firm can capitalize on it (R1). Their focus is rather on the attributes of the technology than whether there is an actual market demand. The larger the scientific potential the IP has, the harder it is for the scientist to grasp the invention lacks commercial applicability (R1).

According to the scientists, the problems accompanying the IP evaluation stem from the timing. As the TTO has to approach firms before the patent is drawn, there are tight restrictions on what they can reveal about the invention (R3). This causes the scientist to take on the task of bringing the dialogue further with the firm and elaborate on the TTO's proposals (R3). Due to the many unknown in the span from invention to commercial implementation, the scientists stand a meagre chance for evaluating the research elements. Seemingly, the process rests on the scientists' expertise while the TTO steps in the background (R4).

The same picture surfaces when asking the private actors. The TTO openly allocates the commercial evaluation to the firms and their forecasting models (R5). Rather it being a mutual agreement, the proposal appears to be one-sided. The TTO has a say on the contractual design, but refrains from touching upon the market opportunities for the product (R6). It appears the interaction mainly flows directly between the firm and scientist, which explains the clear disparity in value judgements due to uneven access to market intelligence.

6.1.2 Managing Organizational Proximity in Greater Copenhagen

UoC's TTO considers opportunism a reoccurring, but natural element in the technology transfer process. The industry attempts repeatedly to siege opportunities as expected (R1). In faith of moral obligations as a public entity, the TTO adheres to a principle of equal treatment irrespective of the company's intentions.

"It is our own obligation to treat all equally, so we provide the same conditions regardless." (R1)

This does not imply the TTO ensues no control measures. Analyses on other university licensing deals act as useful benchmarks (R1). The TTO also keeps an eye on attempts from the firms to influence the scientist directly (R2). In most instances, procedures run civilized (R2), signalling agreements on behavioural routines. The scientists neither

detect calculated behaviour, assuring a perception of firms acting appropriately despite a capacity to shut things down legally (R4). Though, one still has to be wary of whether the preliminary patent is comprehensive enough to safeguard the ideas and potential of the invention.

"You have to be sure that the first patent is enough before direct cooperation with the firm. They are very keen if there is something of value to them." (R3)

It is the job of the TTO not to sell too much of the IP at an early stage, but merely the concrete field the firm desires. The balance is simultaneously to treat the firm fairly, which occasionally seemed questionable (R4). This can create trouble for the TTO in aligning attitudes towards the collaboration as a step towards a proximate space of relations. The firms report of no appropriation of benefits, but emphasize mutual respect between the parties (R6). Unfortunate situations was a matter of mistimed publishing of sensitive information by the scientists without associations to opportunism (R6). The firms state the TTO is eager to secure a piece of the deal, but with the main motivation of a successful technology transfer and properly representing UoC (R5).

Without severe opportunism, excessive control mechanisms become obsolete, which paves the way for operational flexibility. Yet, it might be too optimistic to rule out "red tape" at face value. The TTO strives to reduce the number of strings attached by offering exclusive license deals and demanding simple financial compensation in the form of annual fees (R1). This places few restraints on the firm's scope to apply the IP internally and imposes minimal financial structures (R1). Overall, it appears there are large degrees of freedom to secure organizational distance and autonomy to the advantage of organizational proximity.

The scientists confirmed the presence of large degrees of leeway to influence the clauses prior to finalizing the contract (R3). The TTO includes the scientist in the dialogue and ensures to transfer the IP in accordance with their personal preferences.

"If I wish to utilize a part of the IP in a different way, the TTO is good at consulting with the inventor so they do not sell out too big proportions." (R3)

The bureaucracy took one of the firms by surprise as the TTO's operating framework turned out more rigid than first anticipated (R5). The reaction mirrored habituation from

previous negotiations with like-minded private firms where the majority is negotiable. The incident reflects an organizational orientation typical for an IOC between a private and public partner. In this case, different logics initially prevented organizational proximity and suggested a need for greater coordination by the TTO. In regards to the use of the IP, both firms expressed contentment with the amount of flexibility.

It has very much been up to ourselves. We could take the technology to anywhere in the world in any type of industry." (R5)

"We have had a proper latitude. There is an understanding from both sides that the other part also needs space." (R6)

Minimal frictions in regards to operational flexibility might be a stepping-stone for managing expectations of the output and returns from the commercialization of the IP. The TTO faces a few challenges in fine-tuning the financial outlooks and transfer options for the IP (R1). To solve these, the TTO presents the terms for monetary gains and what responsibilities apply should the firm e.g. wish to opt for sub-licensing (R1). With the firms knowing what to vouch for, provides a better idea of the profitability of the license. This ought to tune firms in on the TTO's financial configurations.

"They (firms) actually consider us a bit like subcontractors and it is there it often goes wrong, if the firm has not realized what type of party they are trying to team up with."(R2)

The quote above indicates room for refining the firms' expectations to what financial mandate the TTO has. This will perhaps alleviate issues of defining common goals and decrease organizational distance. Expectation management from the scientists' view ties to the personal relations with the TTO officers. The chemistry during discussions has an impact on whether or not the realities around the return from the IP leaves disappointment.

"I have been good at talking with the Commercial Officers, but I know scientists who have been disappointed, despite the TTO having repeatedly toned it down. It still turns into a huge problem." (R3)

It appears the TTO announces realistic financial scenarios on a continuous basis, but the key messages might not have the envisioned efficacy. This speaks for a more relatable point of reference for the scientists. The developmental stage of the technology can

prove useful in this regard upon which the size of the return and time horizon depends. The firms' take on expectation management reiterated a sense of limited mediation. The TTO was falling short in many respects when quantifying the IP (R5) and did not play a noticeable role in other instances (R6).

The challenges related to expectation management do not bode well for the TTO, when dealing with opposing U-I incentive structures. While the scientists compete on publications and research data, the industry sees an interest in keeping the invention a secret to secure a competitive lead (R1). To establish a compromise, the TTO makes the firms aware of the scientists' time limit for containing research, but emphasizes a willingness to surpass this threshold (R1). Many scientists find the application of the IP and the opportunities that follows with it key drivers (R2). This permits the TTO to play on the probability that the license agreement leads to additional scientific cooperation with the firm (R2). Such bait can lure the scientist to postpone the date for publishing and thereby harmonize the incentives.

The scientists show great awareness of the firms' agendas whether it being a monopoly in the market or bottom-line growth (R4), which confirms efficient mediation by the TTO. The news requirement from the university to publish and release data also has presence in the minds of the scientists.

"If we are to survive, we have to write and publish articles in journals." (R4)

This automatically sets boundaries for how long the scientists can withhold field discoveries as every year demands novel research. The scientists want to explore where the research leads scientifically rather than commercially (R3), while the firms target delimited areas of research over longer periods to form a competitive advantage (R4). Such mismatch of research objectives poses an obstacle for the TTO. The firms agree on the disparate incentives, which can lead to frustrations, but mostly provides positive dynamics (R5). The need to publish brings tension, but the license agreement dampens this by adding an allowance for the industry's wish to withhold the IP until they are ready (R5).

"The TTO does a great job at reconciling the incentive structures. In all our agreements with the TTO, there are good incorporated mechanisms." (R6)

The TTO seems to have found a middle way to both accommodate the firm and create understanding for the rule of publish or perish for the scientists. This is an accomplishment taking into account an allocation of fewer resources for technology transfers relative to other similar universities (R1). These circumstances shine through in the following statement.

"We started out being two people, then four, six and now 11. So things have started to brighten up, otherwise we have been quite stretched." (R2)

This shows there has barely been enough human capital for the TTO to safeguard and complete the tasks expected of it initially. The TTO also faces extra work in that it cannot drop patents as firms can, but have to consult the scientist and offer it back (R2), thus limiting the capacity. One scientists came to the same conclusion, estimating the TTO's workforce has to increase by 100%.

"There should be a doubling of the staff if they were to effectively transfer my technology to the firms." (R3)

The other scientist has no incidents of bottlenecks working with the TTO, which has successfully involved the right people (R4). This still signals a minimum of human capital, when making ends meet by leaning on external resources. One firm shares this opinion, drawing on a previous occasion where the formal work pended on an agreement stating the formalities, which did not arrive in time (R6). This left a request for additional people with a commercial background (R6). The second firm expressed satisfaction with the cooperation, but saw it necessary to request a reply in regards to a recent clearance.

"The cooperation has worked irreproachably. Lately, however, things have gone rather fast in the firm and the responses from the TTO has been somewhat for-bearing." (R5)

It is evident the TTO's human resource capacity would benefit from additional support to improve chances for organizational proximity.

6.1.3 Managing Institutional Proximity in Greater Copenhagen

The TTO makes it clear that the regulative and legislative structures, embodied in the Law on Inventions from Public Research Institutions, leave little doubt on the TTO's

function (R1). However, the practical implementation of the technologies and defining what market conditions entail are what brings uncertainty (R1). The formalities appear sufficient, but there is a need for a revision of the laws, which are out of date with the technological development.

"The laws are getting old and the technology has developed significantly, which means there are many things you can commercialize or have an interest in the legislation does not embrace yet." (R1)

This spurs "grey areas" when facilitating the regulative structure supporting the technology transfer. The TTO's task of transmitting the legal content to the scientists' and firms' local context can therefore result in discord. Confusion about contractual relationships, however, is not a subject for the scientists. The TTO intervenes at the right times and the legal documentation and requirements progress without complications (R3). In case needed, the TTO finds resources for extra assistance and explanation of company structures and laws (R3).

The firms partly backed the scientists. The TTO impeccably facilitates the legal framework and communicates the legal content, according to one of the firms (R6). The TTO seems to have ruled out any surprises, including aspects of relapse agreements with the scientists (R6). The governance structure causes minor confrontations with the other firm, which seeks more thorough and precise formulations of the legal matters.

"I wished for a deeper mediation of the commercial agreements, including the license agreement and what it means with ownership and right of disposal." (R5)

The TTO fully commits to the institutionalization of the legislative measures and property rights, but does not consider its responsibility to bridge the scientist and firm in regards to legal advice (R1). As the TTO seizes the invention, it becomes the one part in the negotiations (R1). Consequently, the TTO is not an adviser for the scientist. Nonetheless, the commercial officers and lawyers are at the disposal to the scientist, who occasionally participates in discussions on technical issues (R2).

This is well received by one of the scientists, finding that the TTO has full control of shielding their rights and the university's (R3).

"They do an excellent job at protecting the scientist legally, which is vital." (R3)

In practice, the TTO's internal lawyers constantly manage the case and draw in external notes from law firms if necessary (R3). Such procedure leaves the impression the legal advice on patent design correctly modifies throughout the stages of the technology transfer process and tallies with the scientists' thoughts. The other scientist voices less excitement because of the TTO's legal obligations. The law prevents help from the TTO post the license agreement at a time where it is most needed (R4). This limitation points at inefficiencies in the collective institutional setup around the technology transfer.

The firms' perspective on legal advice is somewhat ambivalent as they mostly rely on internal advisers (R5, R6). Specific legal matters has been deliberated, but in a limited fashion. However, one firm would appreciate more details on the procedures for engaging with the TTO (R5).

The procedures tie into how the university's ownership of the IP functions. The TTO devotes careful attention to whether the deal curtails the university's right to continuing scientific research (R1). The TTO leverages and preserves the institutional ownership by claiming the scientists' research rights and abstaining from selling the IP even though the law permits it (R1, R2). This decision may be a nuisance to the firm's license agreement and come unexpected as it e.g. clashes with the freedom to operate (R1, R2). This demands greater efforts not to inspire institutional antagonism by the firm and possibly flexibility in other aspects of the collaboration.

The scientists find the TTO's approach to integrate the scientist in the background of the negotiations highly effective (R3). The latter's scientific expertise supports the TTO in navigating the scientific space by e.g. splitting up the IP (R3), which most likely radiates a greater degree of professionalism towards the firm. This in turn may secure a fair royalty model. The firms also debate fairness, where the first encounter for one of the representatives with the TTO's stand on the institutional ownership caused dissatisfaction.

"We felt their demands were completely unrealistic in respect to the size of the royalty. It was not something that continued, but we felt there was a lot unrealistic way of thinking." (R6)

Whereas the TTO comes somewhat close to distancing the industrial part here, no real issues occurs in the other case. Misunderstandings about disposal of rights over the IP merely reflects a lack of education by the firm (R5).

Enforcing theses rights constitutes a key ingredient in the license agreement, which the TTO explains as two-edged. Mandatory annual reports from the firms ensures the TTO to enforce the agreement, while the company alone handles the enforcement of the IP (R1). That is, patent litigation falls under the wings of the industry in case of IP infringements in the respective countries with the TTO supplying the legal documents (R1). It is therefore a balance for the TTO to negotiate when there is a rationale for entering a lawsuit, at what level and how many resources to allocate to minimize transaction costs and defend the university's IP. Infringements lie, in principle, outside the realm of the TTO for which reason certain contractual mechanisms determine the availability of the scientists to the firms (R2). Clearness around legal commitments seems to have established U-I synergies in the institutional setup, benefitting institutional proximity.

The scientists agree on the distribution of labour in terms of legal commitments by the firm and TTO. There is no expectation of the TTO to take part in the enforcement of the IP past the license agreement and neither that the TTO has the finances to do so (R3, R4).

They keep an eye on the IP, but as soon as the license agreement is up and running, it is the firm's problem. I do not see it as the university's role and I do not think the university does either."(R3)

There seems to be a common acceptance that the TTO helps prevent IP violation and supports administratively, which appears to function well when consulting the firms. TTO assistance on payments of fees and continuation or decommissioning of the IP has inspired confidence in the licensees and potentially reduced expenses (R6). It is worth mentioning one of the firms yet has to come across an infringement, but has until now no concerns (R5).

Legal conflicts are also a rarity in the optic of the TTO, which utilizes external law firms for specific legal issues and quickly establishes the ground rules for the license to diminish controversies (R1). The TTO instructs the firms early on of their responsibility to invest in freedom to operate (FTO) analyses prior to acquiring the IP (R2). Minor remarks emerge from smaller companies on the assignment and timing of the FTO. The TTO attempts to neutralize these by arguing the product specifications' infancy, during preliminary talks, complicates and makes the mapping of loopholes in the patent landscape unfeasible (R2). Other pitfalls include poor technology performance or prior art, which the TTO takes precautions against by *"operating with open cards"* (R2). This suggests evidence for sufficient mediation of the legal content.

The scientists neither consider legal conflicts a threat to the contractual relationship. Double monitoring of the IP by patent agents and commercial officers prove the TTO alert of juridical twists (R3). There is never occurrences of industry initiatives forcing the scientists to conform at the expense of fundamental research (R4), a sign of TTO vigilance and standardized guidelines for what is acceptable behaviour.

Marked guidelines come in handy when the firms add complexity to the agreement by engaging in sub-licensing to other parties. However, such complexity has not yet incited legal dead ends (R5), signifying the TTO has made informed decisions on the terms and conditions.

There is not a legal conflict in it, but it is more a complex negotiation, where the TTO has used external help. They have been good at involving the right people." (R5)

In this context, the TTO demonstrates the ability to specify the requirements of the sublicense, while the other firm emphasize the TTO's sound understanding of weighing out the degree of legal flexibility (R6). Such proficiency leaves the decision-making process without major legal objections.

6.1.4 Managing Social Proximity in Greater Copenhagen

The dissertation discovers that trust building in the sense of facilitating personal acquaintance and emotional closeness is foreign territory to the TTO. This rests on the shoulders of the other intermediaries, while the TTO intervenes upon announcements of inventions to explain formal procedures (R1).

Networking takes place elsewhere at UoC. We handle the specific task of managing the exact collaboration agreement." (R1)

The TTO allots social ties and trust a different connotation as these constructs unfold during negotiations and the subsequent license tenure. The TTO is conscious of the long-term perspective for IP commercialization and the importance of establishing trust at the opposite side of the table (R2). Interpersonal relations and social nearness derive from the TTO's management of behavioural expectations between the scientist and company through the technology transfer process. Alignment of these happen by openness and information sharing to the extent, it does not compromise the interests of the scientist and university (R2). Concretely, the TTO e.g. informs the scientist not to utilize material received from the firm for experiments external to the collaboration to promote fair and consistent treatment. Mutual trust is thus less about nurturing connections in social networks, but closer related to a positive experience from the negotiations.

The scientists viewed trust building more broadly than the mere negotiation to encompass the TTO connecting links to the industry as well. To them it was a matter of leveraging the TTO's trust earned from the firm representatives, rather than involving a neutral third party.

"I wish the TTO would have more time for networking, so you could leverage them more. It is a part of their role and, in my optic, the most important." (R3)

In the absence of personal introductions, the second scientist develops chemistry and respect from direct contact with the firm (R4). Commitment and reciprocity thus rely on the scientist's personal traits and contacts and not on the TTO as a gatekeeper. Mutual trust is neither the TTO's credit for one of the firms due to strong relations with the university already (R6). However, the TTO inspires confidence in the latter firm by having an excellent twinning partnership with UoC and mediation with the scientist (R5).

Trust-based relations precedes a healthy negotiation environment regardless of the actors involved. To stimulate this, the TTO continues its open approach by offering introductory material delineating the practicalities of university operations (R1). The TTO further explains its negotiations principles to lay out the university's intentions (R1),

which encourages a positive attitude for the advancement of social proximity. The scientists also recognize this effect, but picture the TTO more in a role of facilitating sessions with the firms rather than facilitating an atmosphere oriented towards social nearness (R1). It seems a mere coincidence if the TTO had the means to convey and ratify the qualities of the scientist and the business case for the IP to the firm in advance to ignite a sense of courtesy.

The firms confirm the presence of an open dialogue, one particularly praising the TTO's enthusiasm and drive for making the technology transfer a success thus ruling out calculated behaviour (R5). The other firm follows suit, but finds it appropriate for the TTO to remain passive due to a pre-existing relation to the scientist.

"The TTO has neither been supportive nor preventive in constructing the open environment." (R6)

The TTO also takes a passive stand on promoting social interaction between the parties. Workshops, conferences and fairs are platforms for the TTO to spark awareness of technology transfers more than bringing scientists and firms together (R1, R2). The faculties and remaining intermediaries are prime movers on arranging these fora to push for repetitive and effective socialization (R1). Nonetheless, a recent IP fair organized by UoC's TTO in company with all TTOs nationwide displays novel trends by being the first initiative of its kind (R2). Difficulties in attracting the right critical mass of companies has previously deterred any efforts; a threshold the TTO passed in this case (R2).

One of the scientists re-emphasizes the scarcity of time for the TTO to be active in network events (R3). The other has no previous account of engagement in events from the TTO side and therefore resorts to own personal network (R4). However, the Danish IP fair receives strong appreciation, judging from the value it delivered in matching the scientist with guests from the industry (R3). The responses from the firms reflect the TTO's prioritization on networking events. A firm representative had had a meeting with the TTO director, but mentioned of no event enquiries nor the need for it unless the TTO had access to elitist circle with unknown technologies or methods (R5). The other firm mentions modest social involvement in fairgrounds with scientist exhibiting their

results, but expresses no discontent due to own capacity limits (R6). Nevertheless, there is a request for the TTO to reach out to companies with weak ties to the university.

6.1.5 Managing Cognitive Proximity in Scania

At LU, the TTO's scientific scouting originally started by arranging individual meetings with the scientists to uncover their research projects (R7). Intimate contact most likely provides a detailed portrait of the scientists' cognitive condition and allows the TTO to comprehend what principles and concepts govern their mental models. Such in-depth search, however, turned into a costly and hence temporary arrangement, replaced by a reactive stance towards scientific scouting.

"The first step is to see his or hers actual contribution and to define what he is coming with. There is always a need to reformulate or maybe to look in the patent literature. When you have that, okay who's problem are you solving from a technical point of view." (R8)

Special access to databases of company research and patents comprise the backbone of scanning market needs for the scientist's IP (R8). This presupposes a rich flow of enquiries of scientific discoveries, which may become unstable if the TTO does not actively imprint the scientists' sense making of the commercial environment. The TTO's lower priority of internal scouting risks leaving the scientists cognitive distant to the detriment for absorptive capacity. However, the TTO's systematic external scouting of companies and maintenance of industry networks at business conferences might counterbalance this (R7).

The scientists' reporting reflects the account by the TTO. The contacts to the industry prove valuable when TTO Business Developers facilitate meetings and search for private actors. The scientists consider the scouting activities crucial, due to their unawareness of the IP potential (R9).

"You really need someone to hold hands, walking the process. Of course, the researcher has the invention and knowledge and gives the presentation, but there has to be someone to define the opportunities and set up meetings." (R9)

While the TTO offers useful opportunities to discuss with external partners, the scientist point at a minimal effort by the TTO to survey new ideas and scientific research worth commercializing (R10). With limited knowledge of scientists' current research projects,

the TTO trusts in the scientists to seek out the possibilities for transferring their technology. As to be expected, the firms experience little proactivity from the TTO as well in finding a match with a scientist (R11). One firm establishes the relation itself and there is a sense that the TTO leaves the scientists to their own fortune (R12).

This presents the TTO with difficult conditions for bridging U-I knowledge gaps. An officer accentuates this by commenting on the inexperience of the scientists' of how to transform their research into innovation (R7). The negligible resemblance between university science and industry's applied knowledge did not either ease the path to cognitive proximity (R8). To battle the unfavourable circumstances, the TTO relies on employees with both academic and industry experience (R7). Hybrid backgrounds permit a nuanced understanding of each side's knowledge base and therefore allows the requisite for closing knowledge gaps.

From the scientists' perspective, there are areas for the TTO to improve regarding the knowhow of technological processes within their respective field and the conveyance of industry standards for measuring research output (R9, R10). Both scientists emphasize the presence of learning curves for the TTO.

"There are short tracks and fast tracks with FDA but also within Europe. This information and knowledge we didn't receive a number of years ago, but has been something that has been gained with time." (R9)

Learning curves are less of an issue when consulting the firms. Knowledge gaps have minor concern in one case, because of vast R&D resources and a close connection to the scientists' expertise (R11). Effective distribution of labour between the firm and scientist in the other case paves the way for successful collaboration.

"We agreed through the process to continue to work together because no one know the technology or has the heart or the understanding of the technology of those who have invented the technology." (R12)

Judging from the management of knowledge gaps, the TTO has created a momentum for the university scientists and private actors to communicate scientifically. Mediation of a joint terminology, however, is not without problems for the TTO (R8). In spite of the officers' scientific résumés, scientists have regularly misplaced apprehensions of

industry needs (R7, R8). This can deteriorate effective knowledge transfers and restrict U-I interactive learning. The tendency repeats itself in the scientists' optic, one emphasizing the TTO's need for becoming accustomed to scientific definitions (R9). Language mediation turns upside down for the second scientist, who ascribes communicative improvements to own credit and assigns the TTO a liaison function when communicating with the firms (R10).

"I think I have learned their language more than they learned mine. I remember it was really in the beginning very difficult to communicate." (R10)

Turning to industry, one of the firms blames biased behaviour towards the university principles as a hindrance for the TTO to create joint language platforms (R11). The TTO's ingrained routines regarding commercialization programmes appears to work against its favour.

"I think LU, before we came in, had made their own programme to commercialize the product themselves and I must say straight up, I saw that it was a total catastrophe." (R12)

The degree of contention within the previous cognitive items renders LU's TTO mixed prospects for forming a common ground for evaluating the IP. The TTO acknowledges the presence of stark contrasting views between the scientists and industry, which gains fuel due to the embryonic stage of the technology (R7). To nudge the scientist closer towards a commercial orientation, the TTO encourages additional critical experiments to adjust the IP and address the industry optimally (R8). Such educational guidance combined with standard forecasting methods displaying the market value and risk profile of the technology at different stages, provides the TTO measures for valuing the projects objectively.

The approach resonates with the scientists, who praise the TTO for a qualified "*description and discussion about the commercial potential*" and improvements for valuing early and later stage projects (R9). It appears the scientists' absorptive capacity has progressed, enhancing their ability to recognize the value of the IP. This shows the TTO understands how to bridge the two parties. The TTO's forecasting models also receive positive responses, ruling out major disagreements (R10). Cognitive gaps seem

to shrink on the scientists' side; however, the firms did not recognized this. Firstly, there is a lack of comprehension of the amount of resources required to elevate the technology to a product (R11). Secondly, misunderstandings of pricing mechanisms culminate in unrealistic business plans for the IP (R12). There is a wonder of the rationale behind the professor's privilege due to the scientists' insufficient business acumen and missing support from the TTO (R12).

6.1.6 Managing Organizational Proximity in Scania

LU's TTO gave the impression that opportunistic behaviour is a widespread phenomenon. The officers' draw a scenario of the scientist being at the mercy of the companies and the industry accusing the TTO and university for dishonouring deadlines and deliveries (R7). It is neither uncommon to observe private actors exerting pressure on the scientists to unveil sensitive information beyond the project (R8). Such behaviour breeds a distant space of relations between the actors and invites tighter control. The TTO intervenes by submitting its verdict on the fairness of the deal to the scientists when facilitating and occasionally attending the negotiations with companies (R7). The scientists further receive advice on information sharing outside the frame of the collaboration.

"They (scientists) should maybe also have part of the IP or at least have an economic benefit if the company license out the IP, not only be paid for the work." (R7)

The TTO's precautions appear to have the intended effect according to the scientists. Management of contractual relationships proceeds without impediments and unfortunate commitments (R9). The TTO seems to have proficiently guarded against industry's appropriation of the benefits of the technology transfer at the expense of the scientists.

"The TTO was excellent at defending me as a scientist. If the big corporations approach you directly as a scientist, they try getting it for free and then you need a lawyer." (R10)

This builds organizational proximity by reducing uncertainty and increasing predictability of value distribution. Predictability, however, suffers a blow in the eyes of one of the firms, which reports of sly considerations by the scientists. There is a propensity by the latter to opt out from collaborations and commence a new venture to

become a competitor (R11). This presents a reminder to the TTO of revising the instructions to the scientists. The remaining firm observes no opportunistic behaviour thanks to an overshadowing joint passion for the technology (R12).

With a need to keep a stringent rein on the actors, forces the TTO to activate control measures, thus curtailing operational flexibility. Unsurprisingly, LU's TTO both assists the scientists in the preparations to locate a licenser by facilitating industry contacts, coaches them during negotiations and makes a follow-up past the license agreement (R7, R8). The TTO further admonishes the scientists to postpone filing the IP as late as possible, but also recognizes the importance of publishing and presenting the research in public fora (R7). Although the TTO interposes with recommendations, the scientists maintain full charge of the decisions related to the IP with few strings attached.

As one of the scientist yet has to enter a partnership with a company, there is limited experience with how extensive the bureaucracy is surrounding the technology transfers. However, there is a supposition of more restrictive arrangements (R9). The other scientist uttered frustrations in respect to how all procedures pass through the TTO and considers the application process a jumble of requirements.

"It is like everything goes through the innovation office. It is a jungle when it comes to understanding where you can apply." (R10)

The amount of "red tape" is perhaps worth simplifying to advance transparency and the TTO might want to reconsider the regulations. The firms share these considerations due to concerns for the degree of flexibility to implement the IP. Adherence to government KPIs causes the TTO to confine the firms' operational latitude (R11), and divergent perceptions of regulatory standards for commercial operations resulted in conflicting views on how to achieve market acceptance (R12).

"They did not agree with us when we said we had to go the strict regulatory route through EU. They did not really understand the necessity of these studies." (R12)

Struggles in balancing organizational distance and autonomy weakens the chances for managing expectations around commercial output and returns. It therefore becomes paramount to construct realistic commercial scenarios. The TTO directs the scientists progressively through steps of user-centric thinking with an eye out for the IP to solve a

market need rather than chasing scientific perfection (R8). Refining the scientists' anticipations ought to ease the transition to a fair agreement with the industry and incentivize parties to honour engagements. The TTO observes a desire from the private actors to realize this for the sake of developing the collaboration (R7).

The scientists find the industry to be critical towards their preliminary expectations to the output from the IP due to a long series of development phases following the license agreement (R9). However, the scientists believe they together with the TTO have learned when it is legitimate to have hopes of a return from the IP.

"If you take a project to Phase 1 or even Phase 2 with positive results then you really have a value of your project, but having a finding of something that effects something else in a good way has value but it is not very high." (R9)

The process has left the scientists more informed and knowledgeable to distinguish between projects with low and high probability for market penetration. This comes in handy, as it is usual to encounter firms with the expectation of acquiring the IP for a minimal investment (R10).

The industry does not recognize that the scientists are growing a nuanced understanding of what to expect from the technology transfer. The time span for the firms' commercial research projects in terms of sign-offs and completion often clashes with the scientists' scheme of things (R11). Hence, there is room for the TTO to improve mediation of the incongruity between the firms' and university's operating life cycles. The second firm follows track by requesting more proactivity from the TTO in managing expectations around various aspects of the agreement (R12).

The chasm in perceptions on just expectations for the output and return may impede the TTO's efforts in reconciling the U-I incentive structures. LU's TTO encounters insignificant conflicts of interest once there is a settlement on the legal documents (R7), but opposing objectives form considerable barriers (R8). To open the way for a rallying point, the TTO supports the scientist in disclosing with sufficient documentation in place and enlightens them on how the firms' knowledge pool can become a catalyst for future

scientific endeavours (R7). Doing so rests assure the scientists' the TTO safeguards their interests and opens up for potential concessions with the firm.

For the scientists, the timing for publishing remains a controversial question in the context of a technology transfer. To enable continuation of research and nurture an academic career, scientists have an incentive to be first past the post. (R9). However, early data disclosures automatically hasten filing, which within a company ideally will occur past the treatment of the results years later (R9). This calls upon the TTO to mediate the two logics, particularly because significant investments in the IP awaits before it reaches a stage of wide usability. A scientist's statement suggests evidence for that.

They (TTO) have been pretty supportive of the ideas. We have been in contact with bigger companies and in licensing discussions as well. They (TTO) have been good at that in transferring and connecting points." (R10)

The issue on incentives varies depending on the firm. One respondent notices different drivers for motivation and a conspicuous inclination for the scientists to seek an entrepreneurial pathway independently (R11). The other firm experiences no conflicting agendas. The scientists show an eagerness to *"reinvest the money back into the studies, not only to take the money and run"* (R12), which also helps them in the long-term. Such conduct, however, far from the norm and thus begs the TTO's attention.

The amount of attention the TTO can allocate may though be scarce when taking into account the human resources available. The workload per TTO officer has risen in proportion to the number of scientists connected with the TTO, counting 250 to one (R7).

"It is becoming more and more daunting. We have supported them (scientists) so much hands-on until know. Now it is me and 20% of my colleague in a milieu of about 300 people" (R7)

Recently added legal personnel has injected renewed capacity to gauge the terms and reasonableness of the license agreements for material transfers (R7, R8). However, there is yet a leap to save the employees from being overwhelmed frequently (R8).

Operating with such narrow margins of human capital brings the TTO in a position with higher probability of failing to complete the tasks expected of it.

The scientists confirm the TTO has inadequate human resources, but divide on whether it is a matter of expertise or time available. The business developer attached to one of the projects has supplied enough hours, but is missing knowledge breadth (R9). The second scientist finds the amount of staff accessible for explanation and guidance problematic (R10). The TTO has to become more explicit and efficient during the introductory steps in providing an overview of where to find and how to access the wealth of resources (R10). A firm representative reiterates the need for additional labour after having noted the TTO being incapable of leveraging the firm's potential as a closer collaborator (R11). The second firm views the amount of unsuccessfully realized technologies as a standard for understaffing (R12).

6.1.7 Managing Institutional Proximity in Scania

The regulative and legislative structures pose at times a challenge for the TTO to mediate. The lawyers at the university are accustomed to legal content on organizational matters rather than business matters and have their primary obligation towards the university (R7). This is not in keeping with the scientists' commercial undertaking and collide with the professor's privilege.

"They (university lawyers) don't really see their primary obligation is to help negotiate the best deal for the scientist, because it is their IP." (R7)

The TTO describes it as grey zone, as the scientists e.g. sign the CDA contract with the university and institution, but is in full control of the IP. This makes it unclear to the lawyers where the borderline is for contractual obligations (R7). The TTO expresses an understanding for the scientists' need to realize a gain, but considers it a problem to adopt a facilitating position in interpreting the legal bureaucracy to the scientists (R8).

The professor's privilege also gives rise to confusion about the institutional setup for one of the scientists. What started as a complete invention ownership turned into a shared ownership with the TTO as a condition for continued support (R9). Such constellation introduces further complexity instead of simplifying the bureaucracy with the TTO also becoming a party to come to an agreement with (R9). This increases

intermediation transaction costs and can discredit the TTO's reliability. The other scientist does not remark pitfalls about the mediation by the TTO's legal personnel, but has not followed the same trajectory either (R10).

Both firms conclude the regulative structures seem out of the customary to the scientists. One firm can especially detect the scientists' deficient regulatory competences, drawing on experience with entrepreneurs from own internal incubation programme (R11). The second firm underscores the necessity to elaborate on the legal mechanics for the majority of the scientists.

"I believe 99% need this type of help in the process and maybe it should be refined and discussed more than it has been in Sweden." (R12)

The circumstances around the professor's privilege also leaves a stamp on the provision of legal advice. As the TTO occasionally relies on the university lawyers to service the scientists on specific legal subjects, there is a renewal of the confrontations on the affiliation to the university (R7). The TTO's commercial officers have the prime goal of finalizing business deals, while the university lawyers' sole purpose is to protect university assets. To foster institutional proximity, the TTO has to show caution when balancing continuously between the scientists' inquiries and the goodwill of the university resources. Cautiousness is also key for the TTO when standing on the sideline during U-I negotiations. On one hand, the TTO's mandate is to facilitate the conversion of research into utilized IP, but legislation prohibits concrete interferences in the technology transfer process (R8). Reactive advisory, such as background coaching, is the mean to shed light on legal commitments rather than proactively practicing negotiation techniques (R8).

Maintaining such subtle balance may cause doubt on what is acceptable for the TTO to advice on and provoke a more reluctant behaviour. When asking the scientists, the TTO has to adjust its advisory communication to enable a wiser coordination around filing (R9). Every so often scientists accidently present findings in proposals without a plan for securing the IP, thereby giving up years of research (R9). One of the scientist received practical help on filing the invention in the specific case, but questions whether the TTO executes it optimally. Filing is less of an issue for the other scientist, where deciphering

and formulating contracts has priority (R10). Although the scientist only requires modest assistance, there is an acknowledgement that there could have been greater use of the TTO (R10).

As the firms resort to internal law departments or external lawyers for legal advice, LU's TTO plays no role in informing about the terms and conditions for engaging with a public actor (R11, R12).

Speaking of terms and conditions ties into balancing the IP ownership during negotiations. This task places the TTO in an ambivalent situation without being entitled to a decision making mandate due to the professor's privilege (R8). Facilitating the technology transfer process without IP ownership imposes strict procedures on the TTO. In practice, the TTO abstains from leveraging the IP ownership to obtain a fair deal, but experiments with a model involving equity licensing to circumvent its restrictions (R7).

This manoeuvre causes some stir for one of the scientists, who had objections against certain contractual relationships, which the TTO did not receive well (R9). Instead of cooperating around a joint target, the TTO becomes a third party in balancing the IP ownership to the disadvantage of institutional proximity. The other scientist hints at the current ownership configuration and governmental strings as a hindrance for the TTO in accommodating the professor's privilege (R10). With limited intervention by the TTO, the companies predictably report of unrealistic expectations from the scientists to the technology throughout the negotiations (R11). One respondent goes as far as questioning whether the professor's privilege is an *"optimal way for the Swedish society to capitalize on the technologies that are developed at the universities"* (R12).

Despite the fixed passive role, the TTO is not robbed the opportunity to engage in IP enforcement. Depending on the contractual design, specific clauses often serve the TTO the right to audit the firms' potent to the agreement in case of suspicion around reimbursements (R7). The TTO views the enforcement as part of fulfilling the process of bringing research to the benefit of society, but does not consider it a responsibility to engage in patent litigations to protect the invention (R8). Hence, TTO mediation on this item is the exception rather than the rule, which does not surprise the scientists. Though

one of them has yet to face a challenge on the patent, it is not the conviction the TTO ought to have resources dedicated for enforcement (R9). The second respondent openly declares that IP enforcement devolves on the scientist and neither believes the TTO has the financial strength to protect the IP (R10).

On the firms' side, the TTO neither has an imprint on the enforcement. Due to much direct contact with the scientists, the firms typically bypass the TTO when dissolving disputes on IP violations rather than utilizing it for mediation (R11). Patent maintenance develops to a tripartite interplay among the firm, external patent lawyers and the scientists.

"We have been working quite closely on both developing new patents and following up the existing patents both with the patent lawyers and together with the scientist who has taken part in the technology and the patent process." (R12)

Institutional proximity thus appears to rest on the manner the scientists defend the IP, which could more easily pave the way for legal conflicts. On this matter, the TTO enters the scene to offer legal assistance by allocating lawyers and patent firms to the case (R8). To keep things straight with the scientist, the TTO renounces any responsibility for the outcome and composition of the contract. This seems to neutralize infringements, as the situation rarely escalates to the point of lawsuits (R7). The only controversies arising stem from the scientists, whose picture of the ideal agreement now and again departs from the reality (R7). Reminding the scientist of the IP's embryonic stage when the license agreement came into force, works as an argument to calm down tempers (R7).

The threat of legal conflicts is neither imminent in the view of the scientists in spite of a general notion in academia of the industry intending to con its university partners (R9). The gist for the scientists is rather to understand the distinction between having an innovative idea and a tradeable IP than entrenching oneself behind legal frameworks (R9). This suggests proper support from the TTO in standardizing the contract to clarify disputed points.

"The communication was basically they wanted the mouse and a licensing contract and then they (TTO) helped me to suggest a contract to send them. At some point, the TTO lawyer was the one communicating straight with the company." (R10)

In the absence of notable critique from the firms on the handling of legal content (R11, R12), the TTO seems to have understood how to take the right precautions and add objectivity to the decision-making process.

"There were other companies they were discussing with. After half a year of discussion, we reached an agreement and signed the licensing agreement. There was a clear understanding from both sides." (R12)

6.1.8 Managing Social Proximity in Scania

Trust building for LU's TTO implies a redemption of obligations throughout the technology transfer process (R7). The TTO believes that processing contracts professionally together with the scientist and standing ready to untangle legal difficulties preserve sound long-term relationships with the firm (R7).

"You can always have a first encounter, but in order to have a long-term relationship, you need to have contracts in place and handle it professionally. That is really how one can support them." (R7)

To forestall large deviances between the scientist's expectations to the firm and its actual behaviour, the TTO educates the scientist on standard procedures and standard percentage estimates for the contract's constituent elements (R8). Social proximity thus emanates from the TTO's ability to create familiarity with industry measures around which the parties shares common relationships. It is further the opinion that the TTO's neutral ownership position is beneficial to the technology transfer process. Without a stake in the agreement, the TTO find the scientists to discuss matters more freely. This signals a sense of social nearness and a belief in a fair and consistent treatment.

The TTO's efforts to equip the scientists with useful points of references appears to galvanize credibility from the industrial partners for one of the scientists. Mutual trust emerges during presentations of the scientific material due to proficient background support on processes from the TTO (R9). The other scientist is less enthusiastic about the TTO's initiatives on building trust, blaming scarce time and human resources

constraints (R10). The scientist wish for the TTO to build trust proactively (R10), implying a need for better social linkages between the actors to foster reciprocity.

One firm affirms this in reverse, as there is a tendency among the scientists to pursue own goals subsequent to developing the idea with firm (R11). This ignites a concern for commitment and a touch of mistrust. The latter firm has the opposite experience due to a *"heart-to-heart cooperation"*, but stresses the circumstances has been unique (R12).

To my understanding it is not very often they continue working that close as we have been doing." (R12)

The level of trust decides the starting point for the collaborative environment. From there on, mediation can encourage either communicative openness or an orientation towards utility maximization. LU's TTO makes an effort to instruct the scientists of their obligations during negotiations and on the coverage of the legal documents (R7). The TTO hopes to enlighten the scientists on the worth of their knowhow and save them from revealing confidential information prior to publishing and contract signage (R7). Doing so provides the scientist with a boundary for what information to share and potentially stimulates relaxation to engage in an open dialogue based on social closeness. The TTO observes a *"fruitful, give-and-take"* relationship between the parties, where the firms' capacities and knowledge supplement the scientist (R7).

Both scientists acknowledge the presence of an open dialogue, however, one of them detects an unexpected variation in the TTO's standpoints over time due to inexperience (R9, R10). It is an open environment; however, external influence from the industry is prominent as the TTO's knowledge quickly reaches a threshold (R9). This entails sporadic difficulties for the TTO in coordinating the transaction, which risks weakening social proximity. The TTO's limitation reflects one of the firm's accounts, which strive to work closer with the TTO to open up discussions (R11). This indicates the TTO encourages the scientists to be too reluctant to share information to the detriment for social nearness. The atmosphere during negotiations for the other firm is more positively charged leading to balanced solutions (R12).

Beyond the exact negotiations, the TTO engages in a wide range of initiatives to promote effective social interaction between the parties. Courses, workshops, conferences and seminars constitute but some of the platforms the TTO leverages to increase repetitive contact and to inform the scientists of commercial options (R7, R8). It is the impression that exposure to the methodology of evaluation business projects has a valuable impact on the scientists (R8). This speaks for a broadening of viewpoints on commercial perspectives. The extent to which the TTO invests in fora progressing U-I social interaction depends on the spread of common interests among university research groups (R7). However, once arranged the conferences produce rewarding discussions resulting in new collaborations and contracts (R7).

The scientists tore on the extensiveness of the TTO's capacity to facilitate U-I social interaction. One respondent leaves the impression the TTO sporadically attempts to bring firms and scientists together and otherwise maintains a low profile (R9). The other reports of a wealth of activities, promotion and direct announcements, but is uncertain about the scientists' attendance (R10). The communication seems plentiful, though might have to flow via different channels to enhance personal acquaintance between the parties. The firms' responses almost imitate the scientists'. One firm is uncomprehending towards the level of inclusion of companies in events on campus by the TTO (R11). In contrast, the second firm senses the TTO being active in forging social relations with the scientist (R12).

6.2 Comparing Denmark and Sweden

The expectation is that Denmark and Sweden only differ within institutional proximity due to the difference in academia's IP ownership and homogenous university and industry demographics. However, the previous analytical sections show fluctuations within the other proximity dimensions as well.

Each nation adopts slightly dissimilar strategies for achieving optimal cognitive distance. UoC's TTO concentrates on influencing the mental models on the academic side rather than on the industrial, opposite of LU's TTO. Prioritising internal scouting provides weaker prerequisites for connecting to ideal private actors in Denmark, but ensures a more solid understanding of the scientists' scientific discoveries. The Danish scientists'

positive feedback on scientific communication is a testimony to this, indicating they are moving closer cognitively to the industry, whereas the latter remains status quo. The Swedish TTO's systematic external scouting result in useful industry connections for the scientists, but leaves a vacuum in bridging their scientific discourse and in keeping an overview of their research projects. Unsurprisingly, the Swedish scientists find it troublesome to communicate scientifically with the TTO and industry.

Hybrid backgrounds among TTO officers in both countries counterbalance these challenges and drive absorptive capacity. This shines through in the TTOs' varying, but at times sufficient, capacity to bridge the right bundle of knowledge resources from both parties. The Danish scientists question the TTO's consistency in narrowing knowledge gaps and their Swedish colleagues mention issues of reoccurring learning curves. Instability also mark the agreements on the IP's commercial value, where UoC's TTO steps out of the equation apart from involvement in the contract design. This jeopardizes alignment on value judgements by entrusting market evaluations to industry models. LU's TTO takes ownership of the evaluation process to the satisfaction of the university scientists, but without noticeable reduction in cognitive biases according to the industry players. Overall, both countries perform equally within the range of cognitive distance and innovation performance.

This changes when comparing organizational parameters. Opportunisms has a presence in both instances, but is more pronounced in Sweden. This comes forth in the firms' attempt to pressure the scientists to hand over intelligence outside contractual boundaries and the scientists' propensity to opt for venture building. Operational flexibility consequently thrive in the Danish context with larger degrees of freedom for the scientists and industry to influence the composition and application of the IP. Control measures are thus of greater necessity in Sweden, where the TTO operates in closer tandem with the scientists prior, during and after the license agreement. The professor's privilege naturally allows the scientists complete decision power, but TTO procedures introduce a wealth of requirements. The Swedish industry comes across similar difficulties in the form of regulatory standards, culminating in contrasting views on commercial operations.

Different views also complicate both TTOs' management of expectations to the outcome and returns of the commercialization of the IP. Despite persistent efforts, UoC's and LU's TTO respectively struggle in developing and penetrating with realistic financial prospects to the scientists. Logically, the Swedish and Danish industry show little sympathy towards the quantification of the IP. A divide on expectations, however, does not prevent compromises in regards to incentive structures in both cases.

The TTOs successfully provoke the parties to agree on concessions by mapping out common long-term benefits. In Sweden, though, reconciling incentives requires extra monitoring and mediation given the scientists' inclination to commence ventures independently. Monitoring and mediation presupposes a sufficient supply of human resources. Although the workforce of both TTOs has increased, there is evidence for narrow margins of time and depth and breadth of expertise. As stated, one of the Danish scientists estimates a doubling of staff is necessary and the Swedish scientists ask for more time on guidance. The Danish and Swedish private actors detect emerging delays and missing capacity to utilize the collaboration. In summary, Sweden positions slightly worse within organizational proximity.

This trend continues and deteriorates for Sweden when evaluating the institutional items. Mediation of regulatory structures present a minor obstacle for UoC's TTO relative to LU's TTO. The latter faces significant challenges in facilitating the legal content as the professor's privilege distorts the borderline of contractual obligations for the university lawyers. This runs more straightforward in Denmark, resulting in less confusion about the agreement and disposal over the IP. The story repeats when comparing the provision of legal advice. LU's TTO again navigates in a grey zone, as the university lawyers do not have their primary affiliation towards the scientists and there is no mandate to steer legal commitments. The institutional IP ownership frees the Danish TTO for these issues, which encourages the university lawyers to keep the transfer under constant surveillance. Hence, the Danish and Swedish scientists' responses deviate on the TTO's management of advisory communication, the former being content with the dialogue and latter desiring more coordination. The industries are indifferent as their internal legal departments fulfil this role.

Balancing the IP ownership during negotiations also unfold differently in the two economies, but leaves the parties almost equally distant. The Danish TTO's claims of research rights and IP ownership cause frictions with the industry's license, operations and royalty estimates. On Swedish turf, clashes arise between the scientist and industry directly, particularly on views on the technology's payback. The Danish TTO's proactive and Swedish TTO's reactive stance derive from the IP ownership configuration and reflects the approach to IP enforcement. The former enforces the license agreement and supports the firms in protecting the IP, whereas the latter consider auditing and patent litigations a possibility, but not a responsibility. In either case, there is a common acceptance of the casting among the actors, signifying synergies in the institutional setup. This portends well for mitigating legal conflicts, which is a low threat in both countries. Generally, the Swedish TTO has much greater difficulties in managing institutional proximity.

This levels out when contemplating the social aspects. Fulfilment of contractual obligations embodies the common denominator for building trust in Denmark and Sweden. The TTOs reserve trust generation for the exact negotiations, which the Danish scientists criticise as a too narrow scope and the Swedish colleagues question the TTO's capacity to establish social linkages. The scientists in Denmark can rarely leverage the TTO as a trust enabler in the preliminary industry contact. The Danish industry, however, shows no concern of mistrust in contrast to the Swedish equivalent, due to uncertainty about the scientists' commitment.

As the level of trust varies, Denmark and Sweden have different starting points for the collaborative environment. There is a shared ambition of creating an open dialogue, but the Danish TTO embraces a more outgoing method, whereas the Swedish takes a defensive approach. The former presents introductory material explaining the practicalities of engaging with a public partner and its negotiation principles. The latter focuses on instructing the scientists in refraining from revealing more than necessary. The Danish industry confirms the presence of a constructive environment, whereas there is a reluctance to exchange information in Sweden.

While Sweden is less successful in cultivating an open negotiation atmosphere, the table turns when providing platforms for social interaction. LU's TTO not only participates in various fora to promote IP commercialization, but is also the main impetus behind a range of networking opportunities. UoC's TTO has taken initial steps to follow suit with IP fairs, but the Danish scientists remain sceptical of the TTO's scarcity of time and human resources. The Danish industry reports of modest involvement and encourages the TTO to drive greater reach. In all fairness, the Swedish scientists and firms confirm a wide selection of events and promotional efforts, but are unsure of the attendance.

7. Conclusion

This dissertation set out to answer how technology transfer offices try to manage proximity between universities and industries when licensing university-owned patents and what challenges arise during this process in the context of greater Copenhagen and Scania. By utilizing the theoretical framework of proximity, the dissertation arrived at a deeper understanding of the mechanisms shaping university-industry technology transfers in Denmark and Sweden. The dimensions for evaluating the technology transfer office's management of the technology transfer process consisted of the following four types of proximity: cognitive, organizational, institutional and social.

The dissertation discovered the two TTOs prioritize differently when connecting the university scientists and industry cognitively. The level of proximity among the four cognitive items: scientific scouting, knowledge gaps, scientific communication and commercial evaluation of the IP varied accordingly. In Denmark, internal scouting prepared the mental models of the scientists for commercialization; leveraging university assemblies as platforms for creating cognitive proximity. The TTO staff's hybrid backgrounds combined with invention disclosure forms and news investigations formed the toolbox for bridging private actors. The Swedish TTO engaged in business conferences to maintain industry networks and supplied intelligence of companies' research and patents given special access to market databases.

Hybrid backgrounds also played a vital role in bridging knowledge gaps for both TTOs. The probability of resembling the knowledge bases rested on the TTOs' acquaintance

with the industry type and the purpose of the research. There were signs of effective mediation and expansion in the firms' knowledge bases within both economies. Scientific communication flowed undisturbed with the Danish scientists thanks to frequent and constructive dialogues, but UoC's TTO encountered learning curves when dealing with smaller firms. Lund University's TTO saw greater communicative difficulties with the scientists due to misplaced apprehensions of industry needs and had to tweak its understanding of pricing mechanisms and business plans according to the firms. Contention also flared around the commercial valuation of the IP in both countries. Legislative restrictions on patenting hindered the Danish TTO in bridging perspectives, causing disparities in the scientists' and firms' value judgements. To compensate, UoC's TTO favoured backloaded license agreements to establish a fair risk distribution. LU's TTO deliberated the IP in congruence with the scientist by utilizing standard forecasting models, but the scientists still experienced stark contrasting industry views.

The level of organizational proximity fluctuated between the five items: opportunism, operational flexibility, expectation management, incentive structures and human resource capacity. Opportunism was a natural element for both TTOs, but was more predominant in Sweden. There appeared a widespread agreement on behavioural routines with the industry in Denmark and the TTO actively employed control measures. LU's TTO offered contractual support and advice to protect the scientists and to facilitate a fair agreement with the firms, but refrained from further engagement. This resulted in more opportunities for each party to take advantage of the collaboration. The difference in opportunistic behaviour granted greater operational flexibility in Denmark; the scientists and industry had ample opportunities to influence and apply the content of the agreement. The Swedish TTO had to compensate by having closer surveillance of the technology transfer process. This made it more complicated for the Swedish scientists to navigate and the firms considered the TTO's KPIs and regulatory standards inexpedient.

Both TTOs struggled with expectation management despite numerous attempts to clarify realistic commercial outcomes and adjust the scientists' mind-sets. The Danish industry needed further education on the TTO's financial mandate and the Swedish

counterpart wished the TTO had a better understanding of their operational cycles. Both industries found mediation to be weak due to an inability to quantify the IP. While both TTOs were challenged on aligning expectations, they found compromises in reconciling incentive structures. They achieved this by presenting the other parties' terms in a manner that preserved the other parties' objectives and illuminated the collaborative benefits. The professor's privilege, however, required additional mediation due to university scientists' ulterior motive to embark on entrepreneurial endeavours.

The human resource allocation for technology transfers at UoC and LU set tight capacity constraints for the TTOs to fulfil their tasks. The administrative conditions in Denmark hindered cultivation of external networks and contributed to growing latency on agreements and clearances. This resulted in increased reliance on external resources and requests for additional commercial officers by the industry. The Swedish scientists expressed concerns about the TTO's range of expertise and demanded more guidance on technology transfer procedures. The firms postulated that human resource constraints contributed to neglected technologies and unsuccessful commercialization.

Fluctuations intensified within institutional proximity among the following five items: mediation of regulative structures, legal advice, balancing IP ownership, IP enforcement and mitigation of legal conflicts. Mediation of the regulative structure ran into "grey areas" in each region. Because the legislation architecture was outdated, UoC's TTO was uncertain about the implementation of the technology and defining market conditions. The Danish scientists, however, mentioned no difficulties in how the TTO facilitated the legal content to their context and only one firm had minor confrontations. The professor's privilege in Sweden complicated the mediation of the legal content, as the university lawyers had trouble in determining their contractual obligations.

The complications continued in Sweden in regards to legal advice. LU's TTO faced confrontations with the university lawyers once again as the latter had their primary obligation towards protecting LU's assets. At the same time, LU's TTO neither had a mandate to advice directly during negotiations to secure a fair deal. These issues were irrelevant to UoC's TTO as the institutional ownership removed doubts on legal

commitments for the university lawyers. This left the Danish scientists pleased about the advisory dialogue in contrast to Sweden. The industries resorted to internal legal departments for advice and thus remained neutral on the subject.

The two countries also differed when balancing the IP ownership. UoC's TTO claimed and protected the scientists' research rights and kept the ownership of the IP, which created a nuisance for the firms' license. Because the Swedish TTO was not authorised to make decisions, the university scientists single-handedly balanced the IP ownership in the negotiations. This resulted in clashes with industry, due to incongruent opinions of the technology's commercial potential. The TTOs' different stance in each process also reflected their approach to IP enforcement. UoC's TTO actively enforced the license agreement and acquired a supportive function for the firms to uphold the IP. LU's TTO, in contrast, remained passive on these matters. Regardless, the university scientists and both industries gave their consent to the TTOs position.

Legal conflicts were a rarity within both nations. UoC's TTO took its precautions by employing double monitoring of the IP of patent agents and commercial officers and preliminarily introduced the ground rules for licensing. LU's TTO stood ready to assign lawyers and assist on legal issues, but renounced the responsibility for the outcome. In either country, the scientists and industry endorsed the TTO's ability to neutralize lawsuits.

Variations decreased within social proximity between the following three items: trust building, collaborative environment and social interaction. Processing the contracts professionally and promoting transparency around legal matters were key elements in enabling trust for both TTOs. UoC's TTO clarified to the scientists the terms for applying confidential material received from the firms and LU's TTO induced familiarity around industry procedures and measurements. The Danish scientists, however, criticised UoC's TTO for only viewing trust building as an aspect of negotiations and not a lever in facilitating industry connections as well. The Swedish scientists recognized the TTO for building trust by providing proficient background support, but also saw a need for more proactivity in forging social linkages. Trust was of no concern to the Danish firms;

however, the Swedish industry raised a red flag due to uncertainty about the scientists' commitment.

The imbalance of trust arranged a different scene for establishing the collaborative environment in Denmark and Sweden. UoC's TTO adopted an outward approach by delivering introductory briefs explaining the governing principles for entering university license agreements. LU's TTO decided on a protective course, elaborating on the obligations, value of knowhow and the contracts legal coverage to the scientists. Irrespective of the methods, the common goal was to stimulate a relaxed and open setting, which was less successful in Sweden according to the industry.

Although Sweden performs weaker on managing the negotiation milieu, LU's TTO takes the lead in promoting social interaction. The networking platforms LU's TTO organized ranged from conferences, workshops and courses and utilized other fora to advertise IP commercialization. UoC's TTO, in contrast, refrained from arranging events, but was a typical component on the agenda. Scarce time and human resources received the blame for the Danish TTO's modest involvement. However, it is worth mentioning that the rate of attendance at the Swedish TTO's events carried uncertainty.

Out of the previous findings, two main issues stand out. The TTOs lack critical mass and the underlying incentive structures do more harm than good to the technology transfer process, particularly in Sweden. While proximity theory captures the aspect of incentive schemes within organizational proximity, network capacity, internal and external, falls somewhat outside its scope. The cognitive and social dimension presume the TTOs have sufficient industry and academic networks to facilitate absorptive capacity and social nearness. For future reference, the proximity literature will benefit from longitudinal studies investigating how the dynamics of the dimensions alter across time. Such academic efforts will be able to help close the gap on network capacity.

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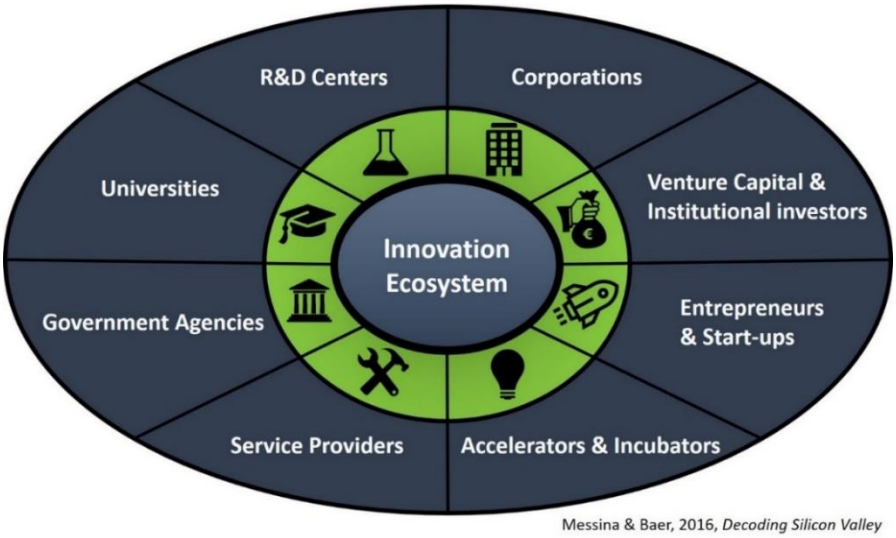
Appendix 1: Figures & Tables

Figure 1. Regional Innovation Ecosystem



Messina & Baer, 2016, *Decoding Silicon Valley*

Table 1. TTO and University Characteristics

	UoC Tech Transfer Office	LU Innovation System Office
No. of Employees	19	22
No. of Inventions	70	103
No. of Patent Applications	15	18
No. of License Deals	26	-*
	University of Copenhagen	**Lund University**
No. of Students	38,615	42,000
No. of Scientists	5,166	4,800
No. of Faculties	6	8

*LU's Innovation System Office does not disclose the number of license deals
NB: The numbers for UoC's TTO is from 2015 and LU's TTO from 2016

Table 2. Respondents

Respondents	Organization	Position
R1	University of Copenhagen	TTO Officer
R2	University of Copenhagen	TTO Officer
R3	University of Copenhagen	Scientist
R4	University of Copenhagen	Scientist
R5	Industry (Denmark)	Firm Representative
R6	Industry (Denmark)	Firm Representative
R7	Lund University	TTO Officer
R8	Lund University	TTO Officer
R9	Lund University	Scientist
R10	Lund University	Scientist
R11	Industry (Sweden)	Firm Representative
R12	Industry (Sweden)	Firm Representative

Appendix 2: In-Vivo Coding

University of Copenhagen			
Informant quotes	**Actor**	**First-order codes**	**Second-order codes**
"The whole scouting process runs via an invention disclosure form, where we ask the scientist if they already have current cooperation going on or whether they know anybody, who could be interested in the technology they have invented"	TTO	Leveraging current network is key: hybrid backgrounds critical i.e. previous experience from industrial and academic communities: lack of systematic scouting process: presenting at mandatory courses and institutes: plenty enquiries: knowledge bases do not necessarily differ	Managing Cognitive Proximity
"We sometimes conduct a news investigation of which companies are active within the technology field to find out if anyone has a dominating patent or one similar that could be a natural partner or one to work around."			
"Utilizing the existing network is what it is all about as the majority of us come from the industry either biotech or other kinds of domains."			
"We have previously had a more systematic scouting process, where we actively went out in the field and looked for relevant technologies."			
"The scientists have to go through the mandatory course, Responsible Conduct of Research… where we have been allocated an hour to explain the rules."			
"Some of the institutes have sometimes invited us to present about technology commercialization and explain what is in it for the scientists and the university."			
"Our 'problem' is that we have had plenty to deal with just from the enquiries that came in uninvited."			
"It is not with certainty you can say the knowledge bases of the university and industry are completely different from each other."			
"Scouting activities of companies to license potential technologies is close to non-existent."	Scientists	Scouting close to none-existent: no time: no sufficient competencies and network	
"The TTO does not have the time, the time to build the competencies, the competencies nor the necessary network to fulfil the scouting activities"			

"It is far easier, if your invention is within Life Science as the TTO can rely on larger corporations such as Novo Nordisk, Lundbeck and other firms alike who has the expertise within your area and the right people for you to be matched with."			
"You need to attract people at CEO or CTO level as scouts, who can utilize their presumably large personal network."			
"The TTO was not able to do the scouting, but outsourced it to a professional agency, who got paid if things were successful."			
"The TTO has worked as an outwards searching market place. I would say they have managed to make a good match. It is not always that everything fits together as we make our own evaluation of marketability of our products. But those ideas the TTO has generated have been relevant and meaningful."	Firms	Good matchmaking: relevant and meaningful input: scientists' skillset provides value	
"In those instances, we have continued with the IP, the scientist's skillset has provided our company value."			
"We came in contact with the scientist ourselves, who sold his rights to UoC. We have an agreement with the TTO, if there is anything that borders to anything we do or something that could be of relevance, they make contact."			
"The difference in scientific knowledge gaps depends on which fields the industry and university come from. It is not always the cooperation is completely fluent."	TTO	Knowledge gaps depends on difference in fields: purpose of the research whether it is fundamental or applied research	Managing Cognitive Proximity
"It depends on whether the research is for fundamental research for knowledge generation or it is research is for development."			
"It is not with certainty you can say the knowledge bases of the university and industry are completely different from each other."			

“The company’s premise is to earn money and to get a product on the market as fast as possible. Our scientists' premise is completely different. Namely to create new knowledge and those two things sometimes clashes.”			
“In order to bridge the knowledge gaps with the firm, it requires you to have a foot in both camps. If the TTO does not have that in the particular case then it is not possible.” “If you hit a topic, where the individual Commercial Officer is competent and has a network… for example if they have been out in company first…, then they are really good at bridging the knowledge gaps.”	Scientist	Hybrid backgrounds are necessary for briding knowledge gaps: difficulties in attracting expereinced and strongly networked personel: lack of incentive to	
“We do not yet have a natural cycle where we get the experienced people to work for the TTO…because there is a lack of incentive as they are not allowed to move to the firms they think are interesting.”			
“It is my impression they (TTO) have had the necessary meetings on a continuous basis and found out what the IP can be used for.”	Firms	Frequent meetings: sufficient correspondance with the scientist: similar knowledge bases: no big knowledge gap	
“It has never been an issue for us when the TTO has facilitated the contact to the scientist as they are located very close to each other.”			
“The knowledge base is somewhat alike, so there have not that big of a knowledge gap.”			
“There are particular scientific communication barriers when dealing with smaller companies which negotiate only a few licensing agreements. We are on different wavelengths. When we engage with larger corporations, it is more about the price of things and what is included in the deal than the language barriers.”	TTO	Prominent scientific communication barriers with smaller companies: no language barriers with large corporations: two different worlds at leadership and scientific level	Managing Cognitive Proximity
“Sometime it is two worlds that has to be reconciled both at leadership level and down at the scientific level, but the scientists usually get together pretty quickly and work on the technology.”			

”We are not involved in the exact negotiations… but there is a good dialogue in the rest of the process.” “I do not think they have had a good understanding of my scientific field…, which means the scientific discussions have been a bit off.” “We started far away from each other, but it has improved since.”	Scientists	Good dialogue outside negotiations: initial lack of understanding of scientific field:	
“We speak the exact same language because we are so science heavy. There has not been any need for an interpretation or translation by the TTO, but that might be the case for companies further up the food chain, which does not do much research.” “The TTO leans up against the scientists to a large extent… those we speak with at the TTO has to relate to a lot of technologies across many industries and it is limited when they sit in front of an industry expert how deep the conversation can go. The dialogue stops at some point, where we take the technology further to see what it can develop into”	Firms	No need for interpretation or translation: marked use of scientist's expertise: conversation depth	
“Some of the scientist, far from everyone, do not understand how much work follows after their invention. Even though it may be a great invention, it can be a really long way before it will earn the firm money.” “It is of particular difficulty to make ends meet when dealing with a smaller company who has not negotiated many license agreements, who wants to license a piece of hardware.” “Pharma is a bit easier as the processes are well documented and there are pretty good models for how to price the technology.” “Industry will always say we are too expensive and we will always say they are too mean.” “I think the commercial value has become less of a point of contention.”	TTO	Lack of understanding of IP development stage: difficult to make ends meet with smaller firms: well-documented pricing models: little contention: backloaded license agreements: risk distribution	Managing Cognitive Proximity

"Our commercialization strategy is based on backloaded license agreements, meaning that the when the firm earns money, we earn money… it is usually something that resonates well the firm… as they think it is a more fair distribution of the risk."			
"The issue of estimating the commercial value of the IP with the firm is that the TTO has to approach them before the patent has been formulated, which means the TTO can reveal very little about the invention."	Scientists	Issue to estimate commercial value: timing: not a process happening: scientist expertise	
"The process of finding the commercial value is not a process I see happening. It is more a question of whether there is anyone ready to lift the patent expenses."			
"It comes down to the scientist's expertise to come up with an IP evaluation."			
"The TTO has been very open that it is up to us to evaluate the commercial value. We run the IP through our systems. To us it has been very much trial and error, the TTO has not played a large role. We have come up with a proposal"	Firms	Firm runs the evaluation process: proposal: contractual opinions: access to market facts: acceptance of firms expertise	
"The TTO more has an opinion about how things should be drawn up contractually than about what the opportunities are for the product."			
"The scientist are very engrossed by commercialization of results… but they do not have access to facts about the market as we have because we have people specialized in that. Consequently, their idea is higher-flying than reality can support."			
"I do not think there are barriers between us and them we work with. The TTO and scientist fully accept that it is our expertise and if we say that something is not worth commercializing, they take it at face value."			
"There is always opportunistic behaviour from the company's side. You would be a poor performing company if you did not chase opportunities."	TTO	Always opportunistic behaviour: fair treatment: equal conditions: benchmarking	Managing Organizational Proximity

“Everyone deserves a fair treatment so there should be no difference if it is an opportunistic company or one which follows the normal paradigm.”		against other universities: direct company and scientist contact: civilized
“It is our own obligation to treat all equally so we provide the same conditions regardless. It is a beautiful idealised world, which does not exist, but it is the principle we try to put into practice.”		
“Benchmarking against other universities is our only chance.”		
“Sometime the company tries to go directly to the scientist, no holds barred.”		
“In most instances, things run relatively civilized.”		
“The general perception is that all the companies I have been contact with act appropriately. It may be that there some capital heavy organizations who can close things down legally.”	Scientists	Majority of companies act appropriately: open and fair: never calculated behaviour: number of patents:
“The firms seem very open and fair. It has largely been the companies who have been run over by the university. I have never witnessed calculated behaviour.”		
“You have to be sure that the first patent is enough or if you have to add additional before direct cooperation with the firm… they are very keen if there is something of value to them.”		
“The TTO has to very attentive to not give everything away, but restrict themselves to concrete field the firm really needs.”		
“I have not experienced the firm wanted higher revenue than expected, resulting in a deadlock with the firm. It is my impression that we were not cheated in the license agreement.”		
“I cannot mention one example of a scientist, who has not treated us with respect, just as we have treated them with respect.”	Firms	Respect: each part wants their share: no motivation by

“We very well know that when we sit in front of a negotiation partner, each party wants their share. They have not been motivated by obvious opportunism. They have been motivated by getting things to work in our case and in the best possible way represent UoC.”		opportunism: getting things to work	
“We make almost exclusive license deals. That means the firm can do whatever it wants with the IP internally” “Certain structures apply, so we do not risk that the patent is left in a drawer just because the firm wants it” “We try to implement mechanisms, such as annual minimum payments to encourage use of the IP, however, in practice the firms has a rather high degree of flexibility”	TTO	Exclusive license deals: structures apply: annual minimum payments: high flexibility	Managing Organizational Proximity
“As soon as a licensing agreement has been made, everything is locked in place. There is not much flexibility there, but during the construction of the licensing agreements, the TTO is excellent at keeping a dialogue with the scientist” “If I wish to utilize a part of the IP in a different way, the TTO is good at consulting with the inventor so they do not sell out too big proportions...”	Scientists	License agreement locks things in place: flexibility during agreement construction: keeping dialogue	
“The TTO acts within the framework it is subject to. That framework is in turn very rigid. We thought the majority was up for negotiation. The reason why we were taken by surprise was that we did not understand the system in the beginning” “There has not been strict regime around the use of the IP. The license agreement mark out clear guidelines what we have and what we do not. It has very much been up to ourselves. We could take the technology to anywhere in the world in any type of industry.” “We have had a proper latitude. There is an understanding from both sides that the other part also needs space.”	Firms	Rigid system: no stricht use of IP: clear guidelines: understanding for both sides	

"There are a few challenges in adjusting the expectations around the finances and who owns the IP. We have to agree on the cost of things, what the firm can do with the IP, where they can transfer it, what responsibilities apply if they want to make sub-licensing"	TTO	Challenging to adjust financial expectations: responsibilities: sub-licensing: unclear on output and partner	Managing Organizational Proximity
"The company has to vouch for what their sub-licensee does, so we do not risk become involved in activities which the universities considers unethical"			
"They (firms) actually consider us a bit like subcontractors and it is there it often… goes wrong, if the firm has not realized what it is they want from the cooperation, what type of party they are trying to team up with."			
"I know scientists who have been disappointed, who has had very high expectations to the return from their IP, despite the TTO having repeatedly toned it down. It therefore turns into a huge problem"	Scientists	Disappointment: high ROI expectations	
"...if we talk about quantifying the IP..., then both the TTO and scientist have to give up in many respects.	Firms	Quantifying IP: no expectation adjustment: between scientist and firm	
"I do not feel the TTO helps adjust expectations. It is very much the scientist and us in between."			
"Some of the scientists we work with disclose because they have to disclose and others voluntarily seek the commercialization opportunities"	TTO	Competitive element: first with research data and publications: competitive lead: built-in conflict: use of IP is a driver	Managing Organizational Proximity
"In the world of academia, there is a tremendous competitive element in being the first with research data and publications… the industry often wish to keep the invention secret in order to gain a competitive lead"			
"There is a built-in conflict in terms of interests. That has to be circumvented, but it is according to the scientist's own wish if the publication should be postponed. We cannot ask more of the scientists than to keep things secret for three months in relation to collaborative agreements"			

“Many scientists actually think that the fact that the IP gets used and provides possibilities is a big driver.”		
“At the university, we are met by a news requirement. If we are to survive, we have to write and publish articles in journals. That means, what we write about next year cannot be the same as what we write about this year. A firm can do research in the same field for many years and focus on more delimited areas”	Scientists	News requirement: survive: focussed research by firms: marketshare: explore research
“The firm typically wants to grow their market share and we want to explore where the research leads us to. I am most interested in doing research; I do not care with the rest”		
“It is two complete different environments, which are driven by very different incentives. We usually feel there is a positive dynamic, but it can also occasion frustrations.”	Firms	Different environments, different incentives: positive dynamic: need to publish: industry allowance: reconciling incentive structures: good understanding of needs
“It is clear in the license agreement that there is a need to publish, but there is also statement which makes allowance for the industry’s wish to withhold the IP until we are ready. I feel it has been very balanced. We have not felt it as any drag or threat.”		
“The TTO does a great job at reconciling the incentive structures. In all our agreements with the TTO, there are good incorporated mechanisms, which allows plenty of time for patenting before the scientist can publish.”		
“There is an extremely good understanding for both parties’ needs. We have that with the scientist as well… where it is almost the golden rule that we would never prevent them in publishing and they will never publish before we have received ours.” “In terms of goals, it is a question of 2-3 sentences in the agreement, confirming the time horizon for publication and patenting.”		

"We have those human resources University of Copenhagen provides…according to the statistics, UoC allocates fewer resources for technology transfers if we compare ourselves with universities abroad"	TTO	Fewer human resources relative to other universities: quite stretched: extra work	Managing Organizational Proximity
"At the moment things run pretty well. We started out being two people, then four, six and now 11. So things have started to brighten up, otherwise we have been quite stretched. The problem is we cannot just drop a patent as firms can. If we drop the patent, we have to consult with the scientist and offer it back. This generates a lot of extra work"			
"It is not so much that they lack expertise, but the TTO staff does not have the time to cultivate their network. Some of the Commercial Officers may have had a large network when they joined the TTO, but if they spend all their time on paperwork there is neither time to scoute inventions at the university or to maintain the network to the companies. There should be a doubling of the staff if they were to effectively transfer my technology to the firms.	Scientists	No time to cultivate network: paperwork: doubling of staff: no bottlenecks	
"We have not experienced any bottlenecks working with the TTO. They have been good at involving the right the people."			
"We have always had two contact persons. One on the commercial side and one on the legal side. The cooperation has worked irreproachably. Lately, however, things have gone rather fast in the firm and the responses from the TTO has been somewhat for-bearing. We needed a clearance on a certain matter, which had to request a reply for."	Firms	Two contacts: slower responses: could not wait: not enough resources with commercial background	
"I do not think they have enough resources. That expressed itself in case where an agreement had to be in place before we could commence the formal work. We did not have any rules in place, but we could not wait."			

“They do not have enough resources with a commercial background, but the same goes for us.”			
“The regulative and legislative structures are pretty clear on what we are supposed to do. It is more the practical implementation or interpretation of things” ”I think the law on inventions from public research institutions is okay, because it provides a wealth of trade options.” “We are supposed to act on market conditions, so it is the art of defining what market conditions are. In principle, the formalities are fine…, but things need to be revised” “The laws are getting old and the technology has developed significantly, which means there are many things you can commercialize or have an interest in the legislation does not embrace yet. “There are some sensible regulatory frames when we look at inventions. Those are clearly regulated. It gets more complicated when we enter grey zones around knowhow. The question is how do you handle that and what agreements can you make around it”	TTO	Clear regulative and legislative structures: practical implementation: trade options: market conditions: revision; old laws: grey zones	Managing Institutional Proximity
“The TTO is extremely good at having a minimum influence. They do not do more than what it says in the law. That is really healthy, because if you wish to commercialize the technology yourself, then you do not have any burden from the university ownership” “The TTO is very competent at intervening only where there is a need for it. We handle the paperwork and all the legal requirements simply and elegantly and if there is a need for more assistance and explanation of company structures and the law, then the TTO tries to make resource available.	Scientists	Minimum influence: handle paperwork and legal requirements elegantly: further assistance	

“I have never considered it an issue for the TTO to facilitate the regulatory structure and communicate the legal content. Since you have understood that the university owns the invention with certain relapse agreements with the scientist, then I do not need to understand much more.”	Firms	No issues around communicating legal content: deeper mediation	
“...when the TTO sits in front of a new negotiating partner… I wished for a deeper mediation of the commercial agreements, including the license agreement… and what it means with ownership and right of disposal.”			
“All agreements related to IP has to be approved and negotiated by the TTO… when we receive an invention we connect it with a commercial officer and lawyer.	TTO	Connect commercial officer and lawyer: no bridge building: not advisers: technical matters	Managing Institutional Proximity
“We do not build bridge between the scientist and firm when it comes to legal advice. We are the one part of the negotiations when we take over an invention. We are not advisers for the scientist”			
“We are always at the disposal of the scientist and we invite them along when technical matters are deliberated”			
“The TTO is very robust at securing both the scientist’s and UoC’s rights. They make sure there are internal lawyers working on the case and if needed, use external notes from law firms. They do an excellent job at protecting the scientist legally, which is vital”	Scientists	Securing scientist and UoC rights: protecting legally: unfavourable legal construction: need help post license agreement	
“The help is in one way okay… but there is a horrible legal construction around it, which means that as soon as you have made a license agreement, then the patent belongs to UoC, and the TTO is longer allowed to advise. If there is anything you need, it is help after the license agreement is in place”			
“It is a bit of a dilemma. On one side, they are our counterpart; on the other side, we have a constructive dialogue. I have sometimes asked their legal adviser about specific matters… but we do not use them generally”	Firms	Dilemma: counterpart but constructive dialogue: rely on internally resources	

"We rely on our own resources" "We pay a lot of attention to whether the deal limits the university's right to continue conducting scientific research. Unlike deals companies in between where one part gives up the right to do research in the particular field…we claim our research rights…free to publish free to make statements about the field. We have the right to publish scientific results even though they may be a nuisance to the firm and their licensing agreement." "The law permits us to sell the IP, however, UoC's strategy is to keep the ownership when licensing. It demands a bit of effort before that is accepted by the firm" "What is perhaps rather unique about a university agreement relative to a standard agreement is that we do not offer any guarantees on e.g. freedom to operate, on the patent, etc. This is a surprise for all companies who engage with us the first time"	TTO	Attention towards university rights: claim research rights: preserve IP ownership: no guarantees	Managing Institutional Proximity
"The TTO does pretty well on that. They have a dialogue with the scientist to avoid exactly that the firms acquire to big chunks." It works really well with the current model, where they swear in the scientist in relation to the license agreement." "You make sure to split it (IP) up, because you have the dialogue with the scientist, who should be the expert within the scientific field." "In relation to the value, it is much harder. It is almost impossible to know which royalty model is the right one as all royalty models can be avoided."	Scientists	Dialogue with scientist in relation to license agreement: split IP: uncertainty regarding royalty model	
"There was not any issue except for the beginning, where we thought we had greater rights at disposal over the patent. We realized later in the process that no matter how much we tried negotiate, then the TTO could not bend the rules."	Firms	Patent disposal rights: fair negotiation: unrealistic way of thinking	

"The exact negotiation seemed fair… but when we had the first encounter with the TTO, we felt their demands were completely unrealistic in respect to the size of the royalty... It was not something that continued, but we felt there was a lot unrealistic way of thinking."			
"There are two elements of the enforcement of the IP. There is an enforcement of the agreement, which we handle by having the firm delivering a yearly report. Then there is the enforcement of the IP rights to which country specific rules apply…the company pays for and runs the enforcement, while we supply the legal documents and signatures" "You negotiate whether one is obligated to sue everyone or whether it is each case that has to be enforced." "Occasionally, we incorporate in the contract that we can offer availability if someone infringes on the IP. Normally there are mechanisms in the contract deciding how much the firm can rely on our scientists for free"	TTO	Enforcement of agreement and IP rights: supply legal documents: negotiation of type of lawsuits: offer availability in case of infringements	Managing Institutional Proximity
"The university does not enforce. They keep an eye on the IP, but as soon as the license agreement is up and running, it is the firm's problem… I do not see it as the university's role and I do not think the university does either. The TTO makes sure the IP is not violated and all the practical stuff, but I do not think they do anything in relation to infringements" "I cannot see they are able to do that. If the IP is infringed then that is it. The TTO neither has the finances nor competences"	Scientist	No enforcement: firms problem not university's role: insufficient finances and competences	
"There has not been anything of concern. We have not had any cases with infringements, so we have not experienced it. Otherwise, it has been business as usual."	Firms	No concerns: no infringements: very good follow-up on IP:	

"I think there has been extremely good follow-up on the IP. There are all sorts of things in regards to payment of fees, continuation of the IP and whether it should be dropped. I can only say the cooperation with UoC has been constructive."			
"…it is rare there is a direct conflict around the law and we cooperate with the big law firms who help us on the more specific legal matters" "We let the company know pretty early that it is their responsibility to conduct a freedom to operate (FTO) analysis before they throw money after the IP. The costs for the FTO goes to the firm… so it is rare there are problems." "Small companies have asked why we don't make a FTO analyses to begin with. The reason is it first makes sense when you have defined the product and then you can better relate to what patents there are already." "It may be the technology does not perform or there is some prior art that shows up, but it is rare that it leads to conflicts with the firm as we operate with open cards." "As a public institution, we are only allowed to do what the law warrants, what is specifically stated in the law. The company can do everything that is not illegal. This creates large difficulties when you negotiate with firms without much experience with universities. Some firms therefore think we are extremely difficult to deal with"	TTO	Rarely direct legal conflicts: firm's responsibility to conduct FTO analysis: operate with open cards: only allowed what the law warrants	Managing Institutional Proximity
"Luckily, as soon as there is some kind of legal twist, external advisers are on the case. The TTO also has external advisers on the patenting, patent agents, etc. There is also always double monitoring of the IP by a patent agent and a Commercial Officer who each have their portfolio. They are very alert."	Scientist	External advisers on patenting: double monitoring: no legal disagreements	

“There have not been any legal disagreements. I have never during my cooperation with the industry had to dissemble myself or being forced to do something else than fundamental research.”			
“There have not been any legal conflicts yet, but there might be something on its way as we would like to transfer a sub-license to another party. We just need to get the conditions in place… There is not a legal conflict in it, but it is more a complex negotiation… where the TTO has used external help. They have been good at involving the right people.”	Firms	No legal conflicts yet: complext negotiations on sub-license: proficiency in involving right people and avoiding conflicts	
“The TTO has been very proficient in avoiding that we ended in legal conflicts. There was one time where it could have resulted in a conflict, but it did not because both sides showed flexibility, certainly the TTO.”			
“Mutual trust building falls more under the other intermediary organizations. We participate when we are invited for events to explain how things work when an invention occurs. Networking takes place elsewhere at UoC... We handle the specific task of managing the exact collaboration agreement.”	TTO	Other intermediaries focus on building mutual trust: manages the collaboration: conscious of long-term perspectives: openness and information sharing	Managing Social Proximity
“We are always conscious that commercialization of IP involves long-term cooperation… so there limits to how much you can cheat each other”			
“There are discussion points such as payments where we completely oppose each other, but fundamentally we try to be as open as possible and share information with firm to the extent it does not conflict with our own interest to build trust”			
“We tell the scientist not to use any material they have received from a company to conduct experiments with for competitors… to keep to the straight and narrow”			

"It is very person-based. If you have a connecting link at TTO who can introduce you to a person in the firm, it works really well. You can easily use the TTO's trust… but it is no use if you need a third party that does not have confidence in anyone. Then it is not the TTO, which creates trust, but the scientist's contact which does"	Scientist	Connecting links to firms for introduction: issue using third party: more time to network:	
"I wish the TTO would have more time for networking, so you could leverage them more. It is a part of their role and, in my optic, the most important"			
"The chemistry between them and us works because we highly respect each other and like each other. It is not the TTO's credit. We had good chemistry because both partners believed in the idea"			
"My experience is that it runs in an excellent way in their regi i.e. UoC and the TTO as a unit. It has also worked in relation to the mediation of the scientist. Those scientists have also had their daily walk here."	Firms	Excellent mediation with scientists: previous relations with the university	
"It has not been relevant for the TTO to build mutual trust in our case because we already in advance have relations with the university."			
"We try to establish a good negotiation environment by being open about the way we negotiate. We have 'pixi books' explaining the practicalities of how the university operates. We negotiate openly and explain our principles… It is pretty obvious what the university wants from the deal. There is no hidden agenda."	TTO	Open negotiations: explaination of practicalities and principles	Managing Social Proximity
"There is no calculated behaviour. The only problem is, if the patent is not drawn first that it is going to be difficult to discuss what has value."	Scientists	No existence of calculated behaviour: direct contact between scientist and firm: prior	

“The contact is very direct between the scientist and the firm. The TTO facilitates more than they have the direct dialogue. It relates to trust, if you can access the right network and get introduced and a TTO employee says you can trust this scientist, he is good, has a good case and IP prior to the meeting with the firm, then there is a sense of courtesy.”		introduction to firm representatives	
“There has been a big wish from the TTO to make things work and, of course, also from our side. It has been a really positive story to build from rather than a calculated dialogue.” “There has to a large extent been an open dialogue rather than a calculated one. Our environment with the scientists was there beforehand, but the TTO has certainly not introduced any constraints. The TTO has neither been supportive nor preventive in constructing the open environment.”	Firms	Positive story: open rather than calculated dialogue: passive role of TTO	
“We do not involve the firm and scientist much in workshops and conferences.” “We are invited as introductory speakers at workshops, but it is not us who arrange them. That takes place locally at the faculties, which have their own network workshop.” “The other intermediary organizations are drivers on events, but we are a natural integrated participant.” “It is often hard to attract the companies…and we have to reach out to them to make them interested.”	TTO	No involvement of scientists and firms in events: other intermediaries promotes role: difficulties in attracting firms	Managing Social Proximity
“They do not have time to participate in the workshops and other network events they should participate in. Last week they had the first Danish IP Fair, where the TTO facilitates that scientists get out at a stand and guest from the industry is invited so you can have a dialogue. That worked and the TTO had the right people there. Hopefully it is something that will be repeated next year. It creates value… you match the right people.”	Scientists	No time to participate in networks: IP fair: matching the right people: never expereinced engagement from TTO	

“I have never experienced any engagement from their side in inviting to events. It runs via own network”		
“There has not been anything. I have meet with the director of the TTO , but that was not facilitated by the TTO. We have never received an enquiry to participate in events. We don’t perhaps have a need for it.” “What matters to us is whether there is anybody with exciting inventions… if it is within IP rights then we have our own circles… it would only be of interest if the TTO knew some circles which could give us something in regards to access to new technologies or new ways of doing things which we could not have known and get in contact with.”	Firms	Contact with TTO director: no event enquiries: access to circles with unknown technologies and methods: no capacity to participate: potential to increase involvement of firms with weak university networks in fairs
“They do involve us, but not much. That is totally fine by me. We would not have the capacity to participate. We have participated in a couple of fairgrounds, where the scientists exhibit their results and we are there with a stand and walk around to talk. Whether the TTO does it enough is difficult to say, as we don’t have the big need. Perhaps companies which don’t have a network at the university already would feel a bigger need for it… I believe the TTO can do more to involve companies without a network in fairs… where a matchmaking takes place with the scientists.”		

Lund University			
Informant quotes	**Actor**	**First-order codes**	**Second-order codes**
"In the beginning it was very much me who booked meetings with them (scientists) and had this dialogue, open discussion about what their research was, what they were doing."	TTO	Booking meetings: look for companies: important to maintain networks: active at business conferences: estmiate	Managing Cognitive Proximity

	"We look for companies, but we also have networks. It is important to keep these networks and keep being very active and then we present these projects at business conferences where life science companies come or organizations. It is on behalf of the scientist. They usually do not go to these conferences." “The first step is to see his or hers actual contribution and to define what he is coming with. There is always a need to reformulate or maybe to look in the patent literature… When you have that, okay who’s problem are you solving from a technical point of view.” “It is more a mapping and scanning process of available information. We have both special access to a market database of the companies and what they are working with in terms of new research and patent database.”	contribution from a technical point of view: mapping and scanning process: special access to market and patent databases
Scientists	“The DC (Diabetes Center) help setup the contact to the private actor. We have had a business developer affiliated to our project and she has been searching for contacts and setting up meetings, etc. I think that has been absolutely crucial, entering this world not knowing about what would be the potential.” “You really need someone to hold hands, walking the process. Of course, the researcher has the invention and knowledge and gives the presentation, but there has to be someone to define the opportunities and set up meetings, etc.” “I have been pretty happy with the scouting activities of the Lund Innovation Office. Of course, I don’t know what I have been missing, but we have had a good opportunity to discus with external potential partners.”	Crucial help with contacts to private actors by business developer: assistance required to define market oppportunities and arrange meetings: good opportunities to discuss with external partners: weak surveillance of scientists' research projects:

“I don’t think they really look up different ideas around the university. Unless you take the initiative as a professor then you contact them. They would not know that you have an idea worth commercializing. They are not actively looking for new product. People would know they exist and most of the researchers understand they can contact the TTO if they want to commercialize.”			
“They could make a survey of what is out there. It has probably something to do with the ownerships, because at KU the university it is in their interest to pick up these ideas that can be commercialized because it is a survival strategy. Here it doesn’t matter it is more like a philanthropic thing.”			
“We presented our idea of what we wanted to do and how to commercialise it… Many people in Sweden have an idea and probably sense if it is possible to commercialise. Either you are not going to be involved in that and then they will try to use the innovation office to bridge to connect with a company that could give grant money to continue their work and take care of the commercialization.”			
“I don’t experience the TTO being proactive in finding scientists and making contact. They could do this a lot more.”	Firms	TTO not proactive: took direct contact to scientist: many scientist try to find commercial partner	
“I took direct contact to the scientists and first met with them at BMC (Biomedical Centre).”			
“Many scientists have a new idea, a patent they have filed for an interesting technology and try to find a commercial partner to develop it further”			
“I worked as a post-doc and then worked in Denmark some years at the serum institute. So I have a bit of more mixed way of looking at things and also of understanding. That is the idea with the innovation managers that they have employed people, who have been working in both sides”	TTO	Mixed way of understanding: employ people working on both sides: researchers not aware of how to bridge into innovation: early stage: basic research is searching knowledge and	Managing Cognitive Proximity

“Because you have the tech transfer organization here and the researchers at the institutions far away they are not always aware of how to bridge their research into innovation and they are maybe in an early stage where they don’t really know that they have something that could be commercially utilized.” “Science and the knowledge, basic research, is searching knowledge. It is not going anywhere like we are going to have the product on the market at a certain time.”		not going anywhere: get stuck in objectives
“They both know a lot of things, but have different objectives. After working with one objective with some time, you get stuck in that.”		
“There are short tracks and fast tracks with FDA but also within Europe. This information and knowledge we didn’t receive a number of years ago, but has been something that has been gained with time and even more so by myself.”	Scientists	Short and fast tracks with FDA: did not receive this knowledge years ago, but gained with time: don't see the important questions from the other side: focus on scientific contribution: different standards of measuring: TTO had learning curve: quality of science not important
“As a scientist you don’t see what the important questions are from the other side. You are very focused on your scientific contribution. Your whole career has been led by that and it is difficult then to understand that it is not commercially valuable. That is difficult to accept. The standard of measuring things are quite different. Once you realize that then you can separate. The TTO have had their learning curve with other scientists. I remember that as being the tougher thing to accept. It is not really important the quality of the science but more whether it is going to able to sell or not. That is the only criteria.”		
“We have our own research centre with many working in R&D, who working together with the scientists .So the knowledge bases are close to each other.”	Firms	Own research centre: work together with the scientists: close knowledge bases:

“We agreed through the process to continue to work together because no one know the technology or has the heart or the understanding of the technology of those who have invented the technology. Licensing money was channelled back to the group to continuing doing research and developing patents and improving the technology, which has been an extreme help in our process.”		continued to collaborate: know technology at heart: license money channelled back to do research and develop patents	
Since I have a Ph.D. it makes it easier to talk to the researchers because they have their own mindset.”	TTO	Ph.D: easier to talk to researchers: scientists are a heterogeneous: understand industrial needs: imaginative apprehension: communication difficulty	Managing Cognitive Proximity
“It is not difficult, but it depends. I come from a scientific background as well so you can try to bridge the gap with the communication.”			
“It depends. Scientists as a group is very heterogeneous. Some of them really fully understand the industrial needs. Others come in with something and have this imaginative apprehension of the industry. You have to check what is a good balance.”			
“There is a communication difficulty.”			
“I think the disease area and the need to clearly define all the different steps has been a learning process for the Lund Innovation Office as well and possibly in cancer related drug developments they may have better knowledge, but in diabetes it has been a learning process.”	Scientists	Learning process for the office to define process steps: learned the TTO's language: very difficult to communicate: TTO liaison function	
“I think I have learned their language more than they learned mine. But it is probably because I have several years of experience of similar organizations with similar purposes before and I remember it was really in the beginning very difficult to communicate.”			
“The TTO had a more a liaison function when reaching out to the companies, but the discussion with the firms we have done ourselves.”			

“It feels like the TTO is there for the university and not for the industry, which means the communication of the research was not aligned with how we communicated.” “It has not always been easy to communicate the scientific knowledge to each other. I think LU, before we came in, had made their own programme to commercialize the product themselves and I must say straight up I saw that it was a total catastrophe." “It is an important aspect because the researchers often think it is worth much more, but if you see it from the side of the industry, it is, of course, a matter of negotiation.” “We try to value the projects from a more objective view, using these usual standards for evaluations within life science. It is easier when you have a drug project, because you can look at the market, you can see how much the market will be worth at what stage, what is the risk, etc.” “The research results are in an embryonic stage and if you want to pursue this path (commercialization), maybe it is worth putting some more effort into doing critical experiments.” “It is very often that we are too early for patenting. The results need to be further adjusted to the industry that you are addressing. It is not a problem. The starting assumption that the scientist thinks the IP is much more worth than the company, but it is also up to the scientist to sell or not because of the professor’s privilege. I am only a facilitator.”	Firms	TTO there for the university not industry: communication not aligned: programme to commercialize was a catastrophe	
	TTO	Researchers think IP is worth much more: value projects from objective view: research results are in embryonic stage: critical experiments: too early for patenting: educational challenge: industry harsh on money	Managing Cognitive Proximity

“The scientist has to realize if someone does not want to pay what he/she expected and has to understand why not. We help the scientist understand this. That is an educational challenge. The industry is very harsh on money. You need to know if it is good for my brand or good for my process or quality. Is it money? You got to have these concrete goals. It is natural. If you want to push the IP on the market, you got to know the rules.”		
“I think that at the given times, there has been a good description and discussion about the commercial potential.” “I think now, the office is good at evaluating the commercial value. I think there has been an increased understanding of where the two parts will potentially meet.”	Scientists	Good description and discussion of commercial potential: increased understanding of where the parties meet: good guidance and system to evaluate: TTO came with proposal
“They have been good at guiding you. If you need a patent lawyer to look at your stuff, there is money we can apply for that. They also have a system to evaluate whether if it is even worth getting to that point. I think that system works. There was no real disagreement between my perception and their perception of the commercial value, but I know that has been the case for others. The TTO came back with a proposal with what the commercial value was on the market.”		
“When we go into a project we invest a lot of resources because the technology has to be developed much further before we can put on the market. The scientists have trouble understanding what it takes sometimes.” “In my experience, working with the scientist is they believe, the IP, is much more worth than it might be. "They didn’t understand the pricing mechanism. They didn’t at all understand what was necessary to take the product to the market place. It became very clear to me when I saw the business plan they had developed.”	Firms	Invest a lot of resources: scientista have trouble understanding: believe IP is worth more: most scientists are not business people: left to own destiny

“Most scientists are not business people at all and that is why I think it is a bit strange they have the professor’s privilege. The support they have has not been successful. It has certain weaknesses. The scientist is typically left to their own destiny to find own solutions.”		
“I think the scientist feel they are more or less at the mercy of companies. That is how they perceive it. I think the companies see it that universities they never keep their promises, timeline, etc.”	TTO	Mercy of companies: universities never keep promises: facilitate fair deal for both parties: economic benefit: companies press scientists for information:
“I also try help set up collaborations with the companies to sought of help to facilitate in that process, so that it becomes a fair deal for both parties.”		
“They should maybe also have part of the IP or at least have an economic benefit if the company license out the IP, not only be paid for the work.”		
“We have some companies that really try to press the scientist for information outside the project they have negotiated on. That I always advice them not to do, because if the firms want more information, then a new contract should be negotiated.”		
“There are good companies and bad companies. Good researcher and bad researchers in the aspect of trying to get individual benefits. It depends on the company. It happens and the other way around. The company is seldom obliged to take something that would cost them money. They can say no, if it does not fulfil any need for them.”		
“That has worked very well. The legal matters with CDAs and contracts and so forth for setting up collaborations.”	Scientists	Worked well with legal matters: TTO excellent at defending: companies try to get things for free
“…the general CDAs and also how to share the IP in collaborations. I think the TTO has been very good at that. So they have legal support in that sense.”		

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"The TTO was excellent at defending me as a scientist. If the big corporations approach you directly as a scientist, they try getting it for free and then you need a lawyer."			
"We wanted to develop the technology in the project and then the scientist started his own company and turned into a competitor."	Firms	Develop technology: scientist start own firm: competitor: no opportunistic behaviour	
"I think we had the same love for the technology and really wanted it to succeed. There has been no opportunistic behaviour."			
"You would like them to file as late as possible, but since they need to publish and present at conferences and so on for them to get more research grants that means you file IP much earlier than would be optimal. That also means you have a long way to go before you really can do something with the IP."	TTO	File as late as possible: publish and present at conferences earlier than optimal: help find licenser and after license agreement: facilitate contacts and coach	Managing Organizational Proximity
"Within licensing, we help them until we can find a licenser. We also help them post the licensing agreement because it is very early projects. It is very individual. I see our job is to make the IP utilized."			
"We can to some extent facilitate contacts. We can coach them and sometimes the researchers is very inexperienced. Sometimes the company is very inexperienced, but they usually have a common objective, to get this IP to be used."			
"We haven't sold anything to any company yet. We don't have a company partner. We haven't experienced such contract and how to set it up, so that may be more challenging."	Scientists	More challenging with contract: send things out freely: feels shitty firms make a lot of money	
"It is like everything goes through the innovation office. It is a jungle when it comes to understanding where you can apply."			

"You normally, nowadays write a NDA and just say that you are not allowed to commercialize this. Otherwise you send out things freely and that you are supposed to as a scientist. You should make everything available. When it comes to companies, it feels shitty they make a lot of money on stuff I don't get anything out of."			
"When the TTO is involved it is also about government KPIs, which set some tight restrictions."	Firms	Government KPIs: tight restrictions: difference between universities and commercial operations: no understanding of regulatory requirements: market acceptance	
"I think there is a big difference between universities and more commercial operations. They did not agree with us when we said we had to go the strict regulatory route through EU. They did not really understand the necessity of these studies because they take quite a long time. It takes time to do the really tough structured professional studies, which the universities does not do. The universities do their studies, but not at a level of GCP, which is a more strict and controlled regime when you do a double blind randomized clinical study."			
"There is a difference in understanding both when it comes to type of clinical studies are necessary and what is necessary to be able to achieve a high market acceptance both for partners to take it to local markets and consumers."			
"If you don't have a fair deal, you don't have a good collaboration and that usually doesn't turn out well anyway. People don't keep their engagement and so on. Also from the industry, they are interested in having a fair deal and to build the collaboration and the relationships. So anything else wouldn't work out. It is not a short-term deal."	TTO	No fair deal, no good collaboration: industry interest in building the collaboration and relationships: not short-term deal: IP has to fulfil need and not perfection: implementation	Managing Organizational Proximity

"The steps of understanding the process that the IP has to fulfil a need and the need may not be perfection. You have to find out what and whose problem you are solving. It is not a driver to do something environmentally friendly. You have to a company that can benefit from it and be able to implement it. There is a need for understanding. Especially from the researcher's side."

"The industry frequently, from my understanding at least, says academics value their inventions so high early on and in the end you have to go through so many different phase."

"If you take a project to Phase 1 or even Phase 2 with positive results then you really have a value of your project, but having a finding of something that effects something else in a good way has value but it is not very high."

"It is a balance of being a little bit naïve and being informed and knowledgeable. If you are informed and knowledgeable and you know that the one in ten thousand discoveries makes it to the market then you give up early on."

"A few companies I have worked wanted everything for nothing, so the lawyer wrote a new version of the contract, which was sent back to them."

"To start a research project is a long collaboration before the sign-off is completed and sometime the scientists' expectations don't fit with what the outcome is going to be."

"All the scientists I have met both need help when it comes to the output and when it comes to the aspects of the agreement. Some of the scientists have too high expectations of what they think they can achieve."

"Many of the scientist treat their technology like their babies, keep them tight and believe they are so important to the world that they cannot be missed."

Scientists	Industry belive academics value invention to high: project value: knowledgeable and naive: companies wanted everything for nothing: new version of contract
Firms	Research project: long collaboration before sign-off complete: scientists' expectations don't match: need help: TTO needs to be more proactive

“The TTO needs to be more proactive in working with the scientist.”		
“They are surprisingly open. It is only that you get the paperwork and if you have the TTO involved, we sought of support them with all the documents and we also see they don’t disclose things without having the proper documentation in place. The companies, of course, know it much better than the researchers, but once you have everything in place, then they are surprisingly open. It is not a one-way thing. The researchers also realize there is so much knowledge out there within the companies which can benefit them also.”	TTO	Support with documents: surprisingly open: scientists realize how the company's knowledge can benefit: IP solely owned by researchers: less incentive for TTO to engage: barrier
“Since you have the professor’s privilege, which is a bit different from Denmark, the IP is solely owned by the researchers. That gives a bit less of an incentive for the TTOs to engage in licensing and to try to help the researchers to negotiate good licensing deals.”		
“There is definitely a barrier, because the objectives are different.”		
“We faced the first issues of academics because we were heading to a conference in the U.S. to present the data and we had to file prior to that. That is the first complication for academics. If this would have been within a company, the filing would have been 2 years later after the work would have been carried out.”	Scientists	Issue for academics: filing prior to data presentation: build career by publishing: TTO good at transferring and connecting points
“To enable continuation of the academic research and to build a career academically, things have to be published.”		
“I don’t think they had a different agenda. They have been pretty supportive of the ideas. We have been in contact with bigger companies and in licensing discussions as well. They (TTO) have been good at that in transferring and connecting points.”		
“There often different drivers for motivation. The researchers are interested in becoming entrepreneurs.”	Firms	Different motivation drivers: researchers interested in becoming

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“They were eager to re-invest the money back into the studies, not only to take the money and run. They wanted to continue to work with us and that also helped themselves in the long-term.”		entrepreneurs: eager to re-invest money:	
“It is becoming more and more daunting. We have supported them (scientists) so much hands-on until know. Now it is me and 20% of my colleague in a milieu of about 300 people. There are maybe 20-30 research groups…”	TTO	Becoming more and more daunting: much hands-on: miliue of 300 scientists: good legal support: look at terms: enough resources, but overwhelmed in periods	Managing Organizational Proximity
“We also have very good legal support, who help us. They look more from a legal perspective, but both are needed. We look at the terms and evaluate whether it is fair this work in the long-run.” “I think we have enough resources. I am overwhelmed with work in periods, but that is another story. Now we have a lawyer that is working with agreements, so making material transfers and aligning it with the researchers and the future perspective of potential license possibilities.”			
“Overall yes. I think in the early stages, not the hours were missing, but the knowledge was missing. But overall it has been working very well. From time to time the Business Developers have served projects and have been occupied more with other projects and most likely vice versa, so we have had to wait a little bit. But overall there has been good access to the people at the innovation system.”	Scientists	Not hours missing, but expertise: overall working well and good acess to people: don't have full access to the knowledge of where resources are: more explicit: not enough resources to enlighten and guide: good to have closer contact	
“One thing that is problematic, that you don’t have full access to the knowledge of where you can find resources.			
“There they could be more explicit because I am sure they know, they have the knowledge in the office, but they don’t have enough resources to enlighten and guide you on how you go about this.”			

“Without them it would be impossible, but they could be efficient on that in the earliest steps. They have filters of what they think is commercially valuable or sustainable, but when you pass that then it would be good to have a closer contact that could sit with you and guide you. I think they try. It is very easy to make mistakes. There are limits to how much public support you can receive.”			
“We would be interested in becoming closer collaborators, but I don’t see the TTO having enough resources to leverage that potential at the moment.”	Firms	Interested in becoming closer collaborators: TTO not enough resources: lot of technologies that never come forward	
“There is a lot of technologies that never come forward because they don’t find the solution moving forward. Perhaps this is an indication of not enough resources for the TTO.”			
“Now we have very good support, but it was a bit challenging because we have the central lawyers here at the university. They are good, but they know more about organizations than business. They also have their primary obligation towards the university and that is, of course, natural. You also have the professor’s privilege here, so they don’t really see their primary obligation is to help negotiate the best deal for the scientist, because it is their IP. So the primary obligation is to protect the university. It is a bit of grey zone here. You usually sign the contract with the university for a CDA for instance, you the university and the institution, but the IP belongs to the scientist. It is not even clear to the lawyers. That makes it a bit difficulty. It is a big challenge.”	TTO	Challenging with university lawyers: know more about organizations than business: primary obligation to university: professor's privilege: grey zone: not clear to lawyers: big challenge: a lot of pedagogics in facilitating	Managing Institutional Proximity
“I understand the importance for them to put time on it, because they need to have something out of it. Do I find it as a problem, yes, but it is a part of the job.”			
“It is a difficulty. There is a lot of pedagogics when you are in this facilitating position… I am not an investor, who can say 'I don’t like that project'. I got to be more sophisticated in my feedback.”			

“Firstly, the inventor has the 100% ownership of the IP, but then early on the Lund Innovation Office, if they continue from a certain stage, would agree to continue, they take part in the inventions. That has been an interesting process because all of a sudden, the people we have been working with become the ones to come to an agreement with.”	Scientists	Inventor has 100% ownership: TTO take part in inventions: come to agreement with: good legal personnel	
“It can always be better, but on the other hand it works pretty good. They have pretty good experience within biotech and pharma and there are lots at the innovation office which come from such industries. They have close contacts with existing companies. They have good legal personnel to and special funds that take care of early engagement with lawyers.”			
“We work with a lot of entrepreneurs as we have our own incubation programme and from our experience the scientists have a lot to learn.” “I could absolutely see there is need to have this type of help for most of the scientist, because they don’t really understand the commercial side of it. Strangely enough, even though you would think they would understand it they don’t. I believe 99% need this type of help in the process and maybe it should be refined and discussed more than it has been in Sweden.”	Firms	Scientists have a lot to learn: 99% need for this type of help: scientists' don't understand commercial side	
“They contact me and if I feel that it is something I need support with, then I contact our university lawyers. They provided good help. It was not a huge problem, but sometimes it is because you have these different views, 'we work for the scientist' because we want to finish business deals and the university lawyers wants to protect the university. We have a bit difference in primary goals.”	TTO	University lawyers provide good help: different views: finish business deals: protect the university: coach in the background: grey zone: advisory role more reactive than proactive	Managing Institutional Proximity

"I coach in the background, but I am never involved in person. It is a grey zone. We have a job to facilitate and bring out research that is made from tax money, which has to be used. The legislation is not allowing us to take such a concrete action in it. Advising is not negotiating. To sit at the negotiation table is not the same as negotiating. The advisory role is more about being reactive than proactive."		
"The question is if there is a plan for securing the IP and once you have told the findings in a proposal it is open for people to see. That is the first challenge. I think there should be a better system or way to approach that problem, because you lose several years of your IP. In particular, if it is a pharmaceutical drug you are delivering."	Scientists	Plan for securing IP: better system or way to approach that problem: good practical help with filing: used lawyers to look at contracts
"I think the Lund Innovation Office also have a responsibility or possibility to make sure researchers are informed about the possibility to file. If you would ask from post-doc or grad students up to professors, I think there is a large % that are not aware of the possibility really and not the fact that, let's say you presented the data at a meeting then you are screwed essentially in terms of filing."		
"We got good practical help with to the initial filing from the Lund Innovation Office. I am not sure if they, at that point, had the time, capability, knowledge to really know how our invention should have been filed in the best way."		
"We have used a bit lawyer help in looking at contracts and writing contracts. We could use them more for that if we wanted."		
"It is professional companies they deal with. It is very focused on pharma, so I haven't experienced any problem. I could see that if you come from a different field that it is much more problematic."		
"We have our own internal law department, which has taken care of the legal aspects."	Firms	Own law department: no advice from LU on patents

“The lawyers are external. We haven’t have had any advice or any connection with LU when it comes to patents.”			
“We don’t actually. Now we are trying to find a balance where maybe, since I work at the TTO where we are able to give away some equity also.”	TTO	Don't balance ownership: equity stakes: no mandate to help the individual: ownership makes it difficult: professor's privilege: decision in the hands of researcher	Managing Institutional Proximity
“It is a difficult because you have this job to facilitate and bring things from the university to the industry and also the other way around. But still you don’t have much mandate to help the individual.”			
“It is more that we don’t have the ownership that makes it difficult. Because we don’t have the mandate to make the decisions, because of the professor’s privilege. That is in the hands of the researcher and thus cannot make the decision according to what we think is the right thing to do.”			
“I had a feeling they provided a standard contract and when reading through there were things that I opposed to and when I opposed to that it was not really taken well. So at that point when it really came to looking into a contract for setting up a joint company, it came to the point it was not fully ‘we’ anymore, but ‘them’ and ‘us’. That was a point where things changed in the relation. There can be a bit of challenge.”	Scientists	Opposed to standard contract: not taken well: not fully 'we' but "them": TTO does not get anything out of it: dependent on government	
“The TTO does not get anything out of it. The TTO here is totally financed by governmental money here and they only want to do a good job. I can see what might be the problem…. the university system is totally dependent on what the government decide what they should spend their money on or how much they allocate. It is not self-evident they will allocate a lot of money because they don’t get much back.”			
“It can be a challenge because they have unrealistic expectations to their technology and the value of it.”	Firms	Challenge because of unrealistic expectations to technology: not sure	

“I have always been a bit puzzled by the professor’s privilege in Sweden because it is so different. I am not sure it is an optimal way for the Swedish society to capitalize on the technologies that are developed at the universities.”		professor's privilege is optimal	
“We have the possibility to do that, but so far… there has not been a need until now, but these are big companies. So we have, in the contract, a right to audit its potent to the contract. We have the possibility if we suspect they do not reimburse, as they should.” “It depends on the agreement. It is still part of fulfilling the process of getting things to the benefit of society or companies, becoming more than an article. It is in the perspective, but I cannot be active in that.”	TTO	No need for enforcement so far: right to audit if no reimbursements: depends on agreement: getting things to the benefit of society	Managing Institutional Proximity
“I have not been in the situation where the patent has been challenged. I don’t know if they have an organization to take care of it.” “That is probably my problem. They don’t have the money to protect any IP. How would they? If they don’t get any money back. So far we have had all the help we need, but I can see it could become a problem further on.”	Scientists	No situation of patent being challenged: organization to take care of it: my problem: don't have the money	
“As we work closely with the faculty we have a natural direct checkup on the IP with the scientist more so than with the innovation office.” “We have been working quite closely on both developing new patents and following up the existing patents both with the patent lawyers and together with the scientist who has taken part in the technology and the patent process. That has been unique.”	Firms	Work closely with faculty and scientist: natural checkup on IP without TTO	
“It is not common to see. I don’t thinks so because they have their legal support and we have our legal support. The only thing is that it takes a long time… once you have the legal support then you know that the contract is done according to how it should be.”	TTO	Not common to see legal conflicts: legal support: scientist don't think it was the perfect deal: remind scientist of stage of the IP: cannot take responsibility for	Managing Institutional Proximity

		outcome: active patent firms and lawyers	
"I think what the scientist feels sometimes is that this was not the perfect deal. But it is also important to remind them of where their IP was when they licensed it out at an early stage. That means it has gone well if they are not satisfied. That means it has been taken further."			
"We always make clear that we cannot take responsibility for the outcome. We don't write the contract for the individual researcher… We have patent firms and lawyers that are active to companies and that is the market valuation."			
"I have had a feeling that academia has the feeling industry is trying to screw them essentially, but I don't think that is the case. It is rather about understanding how much more is needed before you actually can say that you are getting somewhere from a great idea and great findings to having something that is actually tradeable."	Scientists	Academias feels industry tries to screw them: about understanding of difference between idea and tradeable IP: lawyers helped suggest a contract	
"The communication was basically they wanted the mouse and a licensing contract and then they (TTO) helped me to suggest a contract to send them. I only communicated by sending this contract back and forth. At some point, the TTO lawyer was the one communicating straight with the company."			
"There has only been minor misunderstandings, which helped create credibility around legal matters."	Firms	Minor misunderstandings: created credibility: clear understanding from both sides	
"There were other companies they were discussing with. After half a year of discussion, we reached an agreement and signed the licensing agreement. There was a clear understanding from both sides."			
"It is really to keep obligations, which is important. You can always have a first encounter, but in order to have a long-term relationship, you need to have contracts in place and handle it professionally. That is really how one can support them. That is what we hope the researchers feel that they have professional help to manage the interaction with the companies."	TTO	Keep obligations: contracts in place and handle it professionally: help researchers interact with companies: facilitate coaching and advice on standard procedures and measurements: free to discuss: neutral	Managing Social Proximity

“Facilitating and coaching, especially from the researcher, we try to advice him or her what standard procedures are. What is the standard percentage of x, y, z. What is reasonable, what is not? It is a matter of negotiation. For the researcher, I think, it is important to have people like us at the university, because we don’t have any stake sin the deal. They can feel free to discuss and talk about these issues to a neutral person. It is an important backup.”		
“We have been in contact with many companies and presented and discussed so and I think that part has worked well. We have received good support in those processes. That is the short answer. I think they have been able to build trust with the companies we have spoken with already.” “It has been reasonable, but it could be better I think. I don’t really know how. They are busy and they are probably too few. Whenever I have contacted them it has been fine, but perhaps that could be more proactive than reactive in building trust.”	Scientists	Has worked well: recieved good support: able to build trust with companies: busy and probably too few: be more proactive in building trust
"The idea is often developed with the researcher, where we get the chance to get to know each other. But sometimes we are not sure if the scientist wishes to go own ways."	Firms	Idea developed with researcher: not sure if scientist goes own ways: unique heart-to-heart cooperation: not often
“The cooperation we had with BMC and with the scientists has been unique. It has been a heart-to-heart cooperation. To my understanding it is not very often they continue working that close as we have been doing.”		
“We try to make the scientist aware that they are not obliged to say more than necessary. One thing is that you have the IP, contract and CDA in place, but the CDA is not that strong of a legal document. So we try to instruct the scientist to not reveal more than necessary.”	TTO	Scientists not obliged to reveal more than necessary: CDA not strong legal document: give-and-take relationship: very fruitful: companies have a lot of

“We have some companies that really try to get the most out of the scientist, so they should also know the worth of their knowhow. They are not obliged to reveal anything that has not yet been published if they don’t already have a contract. They should get something in return." “There is a bit “give-and-take” relationship between the parties. It is also very fruitful. The companies have a lot of resources, a lot of alternative capacities and knowledge the scientist doesn’t have.” “If it is for the benefit for the deal, we try to coach the researcher in that direction. As soon the researcher takes the results and starts to make money of the results, then he is outside the university sphere. It is not true that he does not get any support. He still gets advice. We have a relation, which takes years, so we can build up confidence. We work as long as they are not making money.”		resources and knowledge scientist does not have: try to coach for open dialogue: relation takes years to build confidence
“It is an open dialogue they have created. The knowledge from their side has increased over time, meaning their standpoints and way of looking at things has every now and then changed a bit in perhaps an unexpected way. It is an open environment, but with the limited knowledge, the external influence has played a big role.” “It has been a very open dialog.”	Scientists	Open dialogue and environment: knowledge increased and standpoints changed unexpectedly: external influence has big role
“We try to implement the research and work more closely with the TTO to open up discussions with the scientist.” "I did not feel it was a big problem negotiating with the scientist. It was a balanced solution we found. Maybe I was a bit too kind in terms of the % we used in the deal, but I thought they had a done a fantastic job."	Firms	Work more closely with TTO to open up discussions: not a big problem: balanced solutions

“It depends. If there are common interests not only in one research group but in several research groups then we have had companies coming to us and researchers to first identify common interests and then scientists from both parts sit together and discuss.” “We proactively take part in having conferences.” “A lot of things come out from these discussions and from that there are projects which are found to be of mutual interest, then one decides on the projects and also to collaborate on that and form a contract about it.” “There are various initiatives. We are e.g. involved in courses. We are involved in special workshops where we had people from Stanford. It is quite good to have to get the methodology of thinking, how to evaluate business projects.” “Some researchers are very interested in this others are not. We also have different arrangements and competitions and we can also be part of seminars to show that we exist and to show what we can do for researchers and students for how to get their ideas outside the university.” “It is always a fight to be seen in the right place and often and to inform people that we exist. Because they don’t need us until they have something they want to proceed with and then they should know where to go. It is very scant marketing activities.” “We have had an arrangement inspired from Uppsala, where you ask companies to have scientific questions or problems and we match them with scientists who work in the area. Then they can discuss what they can advice on within this area.”	TTO	Depends on common interests in research groups: companies coming to us and researchers to discuss: proactively take part in conferences: collaborations and contract come out of discussions: involved in workshops: methodology on evaluating business projects: have competitions: part of seminars: fight to be seen: scant marketing activities: match companies' scientific problems with scientists	Managing Social Proximity

"They have promoted fora where we could connect with private actors. The Innovation Office that we are now in contact with, I think four or five years ago, they made a round to reach out. They went to the PIs (Principal Investigators) and chatted for half an hour, but other than that, my experiences is they are kind of quiet." "I think they have been pretty good at that. Here there is a lot of activities and it is difficult to know who is active. Is it Medicon Valley or who else? They do a lot of promotion of conferences and workshops, but I think most professors don't care unless you actively decide to find your way. Maybe they cannot be more active. We receive mails and announcements of meetings so it is not like we are not informed. They have never had seminars with all the departments and PIs (Principal Investigator) and presented the system."	Scientists	TTO has promoted fora with private actors: went to principal investigators: kind of quiet: lot of activities and promotion of conferences and workshops: receive emails and announcements: never had seminars with all principal investigators
"I am at the university every month and we have an office close to campus, so why are we not a partner in any events?" "We met the professor at the faculty and therefore did really make use of any events, but there appears to be a lot of possibilities to interact with the professors."	Firms	On campus every month: why not part of events: met professor at faculty: lot of possibilities to interact with professors