University of Twente

European Public Administration

Faculty of Behavioral, Management and Social Sciences

Universities & Smart Cities

Bachelor Thesis

"Contribution of science parks to a successful University-Industry-Cooperation"

30.06.2016

Student:

Catharina Isabelle Röttgers

Supervisors:

Paul Benneworth

Veronica Junjan

Table of content

Abstract

Researchers have linked parts of the economic development and progress of a region to a successfully functioning science park. A successful University-Industry-Cooperation is an essential reason for job and wealth creation. It was examined that science parks with links to universities or other higher education institutions play an important role for the innovation of new-technology based firms because of the existing knowledge transfer. Hence, it is essential that the cooperation between the university and the companies of the region is going to be encouraged and supported. Therefore, in this paper it was explored how the science park management can improve this collaboration. This was done on the basis of a cross-sectional case study of the Kennispark Twente in Enschede, Netherlands by semi-structured interviews with participatory actors. As a main result, it can be concluded the science park management can improve the cooperation by the creation of events to create possibilities of network creation and by the implementation of specific departments responsible for the University-Industry-Cooperation.

1. Introduction

Science parks are an important resource network for new-technology based firms and firms located in a science park with links to a Higher Education Institutions tend to have a higher rate of job creation than firms that are not part in the network of a science park. Therefore science parks play an important role in local policy and in regional development (Loefsten and Lindeloef., 2001). Although, science parks only contribute to an improvement of the economic growth in a region if certain "success factors" are fulfilled (Ratinho and Henriques, 2010).

The aim of the paper is to come up with an exploration of how science parks can commit to a more effective UIC by reducing barriers of proximity and can therefore contribute to regional development as well as what the individual parties can do. Therefore, it is important that more attention is payed to proximity and the ways proximity can be created. However, studies which examine proximity already exist, although the focus of these studies is more on institutions helping to create proximity and on the geographical distance. The core of this paper lies on the social and the organizational aspect of University-Industry cooperation, which is often underestimated and omitted.

This paper is going to examine to what extent science parks can improve University-Industry co-operation by removing obstacles and barriers that hinder the successful cooperation between the university and businesses. Specifically, this paper is going to conceptualize the ways in which science parks can contribute to proximity, so on the five types of proximity described by Boschma (2005), namely cognitive, organizational, social, institutional, and geographical.

The science park which was taken as a case study in this paper is the Kennispark in the region of Twente in the Netherlands. The university-business cooperation of the University of Twente and the local companies is going to be studied to look at how proximity is created by the science park management.

It will be analyzed, on the basis of several projects in which the University of Twente cooperates with companies located in the Kennispark, to see if the UIC contributes to building proximity between the university and the business actors. It will be further examined what every single participatory partners did to create proximity.

Therefore the following research question is going to be addressed: “To what extent can a science park improve University-Industry-Cooperation (UIC) by creating proximity to ensure the UIC better meet the needs for participating actors?” In order to answer the research question, the research will be based on already existing literature, concerning proximity, which will serve as a theoretical framework and will consist of nine qualitative interviews with the management of the Kennispark Twente, with researchers of the University of Twente as well as with representatives and CEOs of businesses located in the science park.

The paper is structured as follows: the research question, the theoretical framework giving the basis for this study, the methodology and the case study, the analysis followed by the discussion and the conclusion.

The cooperation between universities and businesses is not always ideal and can often be improved. An optimal cooperation is often hindered by missing trust between the individual partners. Missing trust is conceptualized as proximity gap. The specific focus of this paper lies on the way science parks can build proximity between universities and businesses by eliminating those gaps (Ratinho and Henriques, 2010). It shall be examined if the science park management can contribute to a better performance of a science park by reducing the problem of missing proximity.

In the specific case of the Kennispark Twente the research aims at identifying already existing UIC between the University of Twente and businesses located at the Kennispark and analyzing them by virtue of their development. This means that the research of this paper is going to analyze projects that are co-created and co-developed by research teams of the University of Twente and companies located in the Kennispark. Different goals, different knowledge background, times-scale problems, trust are types of mismatches that hinder an efficacious collaboration between the two stakeholders.

As already stated a successful, smart and efficient cooperation between universities and businesses in shared projects with good results can lead to a successful performance of a science park can even further lead to an overall improvement of the region which the science park is located in. So the paper aims to identify the arrangements that have already been taken place in order to reduce the different types of distances by eliminating or at least decreasing obstacles and barriers which are impairing the cooperation between the

University of Twente and local businesses, and to conceptualize those arrangements in terms of proximity building.

The main research question of this study and the two sub-questions are:

"To what extent can a science park improve the University-Industry-Cooperation by helping to ensure to better meet the needs for participatory actors?"

a) How has the situation of the University-Industry cooperation been at the beginning and what were the needs of the participatory actors?

b) How did the science park management contribute to the reduction of distances and create proximity?

2. Theory and Theoretical Framework

The next part contains the theory which the theoretical framework of this paper is based on. The theory is divided into two main parts. In the first part, the influence of science parks on the University-Industry cooperation is going to be demonstrated as well as the main determinants of success of science parks. The second part presents the five types of proximity based on the analysis of Boschma (2005).

2.1 The Influence of Science Parks on UIC

Science parks are seen as drivers of economic development and as an effective instrument for universities and industry to interact. Ratinho and Henriques (2010) concluded that Science Parks can indeed contribute to economic growth and development, but only if they are successful in their operation. They developed two main determinants of the success of Science Parks, namely (i) university links and (ii) suitability of management. These two factors play an important role in contributing to economic growth and regional development according to Ratinho and Henriques (2010).

The first characteristic for the success of Science Parks, university links, which implies knowledge transfer from universities and other R&D institutions is divided into three further underlying determinants, (i) The need for universities, (ii) Institutional commitment, and (iii)

Nature of the university. The exploration of Ratinho and Henriques (2010) includes that spatial closeness of universities and companies is not a crucial contributor to the strength of the links of UIC, but effectiveness of these links is. Furthermore it is stated that the presence of academic spin-offs contribute to an improvement as well as the aspect to be effective in the field of science and technology in order to have a successful science and technology park. The second characteristic, suitability of management, which was examined contains of the sub-determinants (i) The management profile, (ii) The services, and (iii) Innovative ideas. The role of management of a science park was analyzed as essential for the success of Science Parks. Therefore specific expertise is required, because of complex processes, e.g. technology transfer (McAdam et al., 2005) and business development processes. In addition to that SPs have to fulfill demands of various other actors, because of the aspect that SPs are often part of a regional economic development strategy (Hackett and Dilts, 2004). Because of these it is indispensable that a SP manager has to be a scientist, a politician, and a business man with the ability to communicate effectively and to interact with different actors of the local innovation system in order to guarantee a successful UIC (EIB, 2006). In the second sub-determinant, services, it is written that four services should be provided to companies located in a science park, namely (i) incubation schemes, (ii) shared infrastructure for work and leisure, (iii) flexible premises allowing companies of all sizes to dwell in, and (iv) promotion of tenants through the image and reputation of the park. Furthermore, for a successfully functioning of a Science Park new smart and efficient ideas a necessary (Ratinho and Henriques, 2010). According to Ratinho and Henriques (2010) the theory that SPs can contribute to the economic growth and regional development was confirmed, but only if the characteristics and success factors, mentioned above, are fulfilled. By meeting the mentioned requirements SPs can help to improve UIC. However, it is often the case that many barriers between universities and companies exist that hinder a successful cooperation between these two actors. These barriers can be conceptualized on the basis of Boschma's (2005) five types of proximity, geographical, cognitive, organizational, institutional, and social proximity. A science park can function as a mediator between these two parties and reduce the lack of proximity by its contribution.

2.2 Introduction to a successfully functioning cooperation

Boschma (2005) defines it as “the spatial or physical distance between economic actors, both in its absolute and relative meaning.” As already mentioned, geographical proximity, so the spatial closeness, facilitates the knowledge exchange (affe et al. (1993) and Audretsch and Feldman (1996) and, therefore, the cooperation between partners with different backgrounds. Although, not only knowledge exchange is necessary, also interactive learning plays an essential role in a successful cooperation and interactive learning can only take place if the university and the companies are located in the same region or even better in the same municipality Maskell (2001).

According to Simon (1955) it is not possible for actors to act to the best, because of ‘cognitive constraints’ due to the fact that all participants of the market are behaving according to bounded rationality. In order to minimize uncertainty and insecurity businesses develop routines and routinized procedures and processes, especially in the research and knowledge creation process (Boschma, 2005). As a consequence it is often the case that firms do further research on the knowledge that is already existing. Hence, the creation of knowledge and innovation is mostly conducted in firms with a large base of specific tacit knowledge (Boschma 2004). This situation creates differences concerning potential and interactive learning between various stakeholders of a network or within an organization. Therefore, the result is the remaining existence of cognitive differences (Antonelli, 1995). Antonelli (2000) further argues that knowledge is divided among different stakeholders. Although, it is of high importance to bring the dispersed parts of knowledge together and to share the several knowledge parts between all participatory stakeholders due to the fact that successful knowledge creation and effective innovation depends on the combination of different and complementary abilities in an complex heterogeneous network. Hence, it is of essential importance to combine and share tacit knowledge as well as the different capabilities (Nooteboom, 2000).

However, the pure access of tacit knowledge is not enough in order to get an effective and efficient cooperation and development. An effective transfer of tacit knowledge can only take place if all participatory actors are able to understand, interpret, and to efficiently use it (Cohen and Levinthal, 1990). Perez and Soete (1988) also showed that a negative relationship between a company-own knowledge base and the expenses a company has to

spend in order to get the knowledge which is needed for further development and innovation. They argue that there must always be a certain amount of tacit knowledge for every technological innovation, otherwise firms would not be able to proceed because of the existing lack of knowledge.

2.3 Five Types of Proximity

In the following section the theoretical framework is going to be applied specifically on the case of the cooperation between a university and businesses concerning the conduct of common and co-created projects. This section focuses on the more precise explanation of how the five different dimensions of proximity are applied on the collaboration between a university and firms in the organizational network of a science park.

First, geographical proximity, so the spatial closeness, facilitates the knowledge exchange and, therefore, the cooperation between partners with different backgrounds. Geographical proximity can facilitate the other four forms of proximity. For instance, in the case of usage of the same machines, it could be the situation that one of the parties, for instance the party of the university does not have the knowledge to work with a certain machine. Hence, it must be explained how the machine works in order to proceed with the common project. Because of the fact that this would not be possible if there were a large distance between the university and the companies.

Second, cognitive proximity in general means all stakeholders share the same set of believes, ideas, practices and norms. Concerning the situation of the collaboration of a university and firms it emphasizes the formulation of a common problem definition and a common routine. The actors of this paper are students and employees or CEOs of companies that are going to be examined to see how proximity is built in collaborative projects. It is necessary that these actors of the firms and the university have more or less the same knowledge base, so that both parties have the same view and are able to understand and successfully use the transferred tacit knowledge. In order to better understand the view of the other party, the organization of common workshops and meetings, for instance by the management of the Science Park, would be a helpful measure to give each other an understanding of their view and to exchange their ideas.

Third, organizational proximity can be seen as the capacity to understand each other's goals and to respect those. Concerning the University-Industry-Cooperation it is often the case that the two participatory actors have differing goals. The researchers of the university who take part in a co-created project want to create new knowledge and publish whereas the actors from the side of the companies want to develop a new product in a short amount of time and to make profit. As a consequence of the diverse goals, a timescale-mismatch can be found. Hence, it is essential that both parties accept the diversion of the goals and to convert the organizational routines of each party into a shared working plan concerning the process of the project, to secure all parties can achieve their goals. As already mentioned above, all stakeholders have to realize and to be able to work with the differing goals of both sides. This can be done through communication and determination of those goals.

Fourth, in the case of high personal trust it is referred to the dimension of social proximity. Social distance is present if the personal relationships between the researchers of the university team and the stakeholders from the side of the company affects the project and the process of the project in a negative way because of mistrust in personal relationships based on negative personal experiences with each other for instance the disrespect of an agreement or the misuse. A distinction can be made between functional and friendship social proximity. Functional social proximity is defined as trust in the partner to be able to work on the project. Whereas friendship social proximity defines the feeling on a personal basis to the person (Caniëls et al., 2014).

Fifth, institutional proximity refers to the macro-level and to the institutional framework all stakeholders are involved in. So, institutional proximity is linked to common routines, established practices, and rules or laws that regulate interactions. In the case of the University-Industry-Cooperation, rules and regulations which are created by the institutional framework, so by the management of a science park, can affect the procedures of the cooperation. A positive example of how Science parks can contribute to cooperation is the situation of Finland until the 1980. It was the case that universities were not capable to own private companies which complicated the cooperation with other companies. The ecosystem of a science park then was able to give the solution for that complication. In order to create institutional proximity for this situation those kind of barriers have to be removed. This can be done by the creation of 'free-trade-zones' in which both stakeholders have the possibility

to slightly bypass the institutional regulations. In addition to that the science park management should, in case of a lack of institutional proximity change the current way which institutions are working in, monitor the projects in order to be able to better understand both sides, and to be able to empower entrepreneurs and research groups.

Because of the fact that this would not be possible if there were a large distance between the university and the companies. However, the part of geographical proximity is only addressed to a small extent, because the University of Twente and the companies are already located close to each other in the Kennispark.

2.4 Further implementation of proximity and their interdependency

However it is not possible that the application of successful approaches by other regional actors is only done through geographical proximity, because geographical proximity does not automatically arise the other types of proximity. Even if geographical proximity simplifies collaboration between universities and businesses (Malecki and Oinas, 1999).

This stresses the necessity of cognitive proximity, so that involved actors have access to new knowledge to further improve their development. Although, the company-own knowledge base should be relatively close to the new tacit knowledge to be able to understand and, especially, to apply the received knowledge (Boschma and Lambooy, 1999). Cognitive proximity enables all actors of a network with a, to a certain extent, shared knowledge base and common specialist knowledge to learn from each other and, hence, to effectively improve and strengthen their own development (Nooteboom, 2000).

Organizational Proximity is, as well as cognitive and geographical proximity, crucial for a successful University-Industry-Cooperation and therefore organizational practices for interactive learning. According to Boschma (2005) organizational proximity is seen to be beneficial for innovation and mutual and interactive learning. Furthermore, Boschma (2005) states that a common knowledge and competence base is an essential factor mutual learning. He further states that the creation of knowledge and a common knowledge base is depending on the coordination of the exchange of complementary knowledge of the various involved actors between each other. Networks, for instance, are a typical organizational arrangement which serve as a way of coordination of knowledge transactions and are,

additionally, “vehicles” which allow the exchange of information and knowledge (Cooke and Morgan, 1998). According to Gilly and Torre (2000) organizational proximity is described as “the same space of relations” which are based on successful “interactions of various nature” as well as similar connections in which the involved actors are sharing the same knowledge. Organizational proximity is divided into two different types, namely inter-organizational relation of similarity and intra-organizational relation of membership (Kirat and Lung, 1999).

Boschma (2005) defines organizational proximity as a “set of interdependencies within as well as between organizations connected by a relationship of either economic or financial dependence / interdependence within a network” and further described as “the extent to which relations are shared in an organizational arrangement, either within or between organizations”. Important features of organizational proximity are, hence, the ‘rate of autonomy’ and the ‘degree of control’ in organizational networks or arrangements. Low organizational proximity means for instance the lack of ties between independent actors, so between universities and firms in this case, or only weak ties for instance loose networks, e.g. flexible networks (Boschma, 2005). One problem of low organizational proximity is the aspect of uncertainty that is produced by new knowledge creation. Hence, strong control mechanisms are necessary in order to solve this kind of problem as well as hierarchical organization or close relationships between all involved stakeholders (Boschma, 2005). He further argues that strong ties are indispensable, because of the fact that the transfer of complex knowledge demands for constructive feedback. According to Hansen (1999) the transfer of specific knowledge of product development projects is stimulated by strong ties in an organizational arrangement and not by weak ties.

Boschma (2005) states that economic relations are always related and, furthermore, dependent on social ties. This means that economic outcome is affected by social relations. He further states that the better and the more socially related the ties and networks are, the better is the interactive learning and, hence, the better the performance and the innovation of all involved stakeholders (Boschma, 2005). Due to the factor that weak social ties, or a large social distance, can hinder interactive and mutual learning, as well as successful innovation. Boschma (2005) defines social proximity as “socially embedded relations between agents at the micro-level”. According to the definition of Boschma (2005) relations

between actors are ‘socially embedded’ when friendship, kinship, and experience which are based on trust are existent.

As already mentioned social proximity is necessary, because of the aspect that interdependent organizations learn from each other and co-innovate. It is proven that social relationships which are based on a high level of trust simplify the exchange of specific and tacit knowledge between different involved organizations (Maskell and Malmberg, 1999). In addition to that social proximity has the effect of a better social and open approach of the so-called ‘communicative rationality’ and is not only seen as a calculative aspect in order to reduce costs (Lundval, 1993). Furthermore, social proximity has another positive effect, namely the effect to minimize the risk of opportunistic behavior (Boschma, 2005). In order to conclude, social proximity must be part of a good University-Industry-Cooperation, because mutual learning and a successful cooperation can only be present if both participatory actors trust each other on a social basis.

In contrast to the social proximity which takes place between the different stakeholders at the micro-level, institutional proximity, related to the institutional framework, takes place at the macro-level. Institutional proximity implies a common set of values (Boschma, 2005). Institutions are defined as “sets of common habits, routines, established practices, rules, or laws that regulate the relations and interactions between individuals and groups” by Edquist and Johnson (1997). Boschma (2005) further evaluates that institutions reduce transaction costs and the presence of uncertainty by supporting collective action. Institutions can be divided into two different types, formal and informal. Formal institutions are laws and other regulations for instance, whereas cultural norms and habits stand for informal institutions. However, both types have an influence on the coordination of common actions by the various parties that are involved in the cooperation. Hence, institutions have an impact on the knowledge transfer, interactive learning, and on innovation (Boschma, 2005).

Institutional proximity implies first economic actors that share the same set of values and cultural habits, and second are acting according to the same institutional rules (Zukin and DiMaggio, 1990). Boschma (2005) argues that institutional proximity strengthens interactive learning and innovation, because information is transferred in a better way with the presence of cultural proximity and a common language, due to the fact that a common language, common habits, the same law system with the same regulations concerning

ownership and intellectual property has a positive effect on economic coordination and interactive learning. Stable conditions are provided through institutional proximity and, hence, because of stable conditions between various actors of a network, successful and effective interactive learning, leading to innovation, is possible.

Especially the combination of all five dimensions of proximity provides and creates solutions to the severe problem of coordination that hinder an effective cooperation (Boschma, 2005). For instance social proximity may be able to increase cognitive proximity as well as geographical proximity can decrease the lack of social proximity, because of the aspect that short distances enhance social interactions and, hence, stimulate trust between the several partners (Boschma, 2005).

In the previous section, the theory has been presented which the theoretical framework of this paper consists of. The first part illustrated the importance of successful science parks and well-functioning University-Industry cooperation. The second part was the presentation of the five types of proximity that exists and is, hence, of essential importance for the theoretical framework of the paper, because the concepts of proximity are going to be the basis of the analysis of the five situations.

3. Methodology

The following chapter on methodology contains an overview about the research methods that have been used, the sources of data and the reasons for the choice made.

3.1 Research Design

The research question implies the understanding about a complex process and does not have the intention to prove the existence of a relationship. To answer the research question of the paper, detailed information must be gathered. In order to get these detailed information a case study approach has to be applied as research design with primary qualitative data, secondary qualitative data and observation as data collection methods.

To secure a generalization to other places, so to secure external validity of the case study, it is necessary to gather enough evidence, so enough interviews in this case. However, only nine interviews could have been conducted due to a low rate of response to the contact attempts made. The interviewees have been selected on the basis of their position and their background to guarantee an inclusion of all three different parties which need to be considered in this case study. They have been found with the help of the internet and further with the help of other interviewees. As already mentioned, the amount of interviewees is relatively small to get enough evidence for an explanation, however interviewees of all three parties have been interviewed. Hence enough evidence for an exploration of the case could have been gathered and to offer some insight to the topic.

3.2 Methods for Data Collection

In order to collect the data for this cross-sectional case study, a qualitative approach has been used. First, qualitative primary data has been collected with the help of nine face-to-face interviews during the end of April until the end of June. Due to the lack of response to the approaches made, it was only possible to get nine interviews. These interviews have been conducted with two students of the University of Twente, three persons from the companies of the science park Kennispark Twente, and with the science park management. Concerning the science park management, the representative of the director has been interviewed as well as another board member, the head of the business development department, and the head of the science shop. Second, qualitative secondary data has been used. The secondary qualitative data was taken from the websites of the Kennispark Twente and from the companies examined. Third, data has been collected through own observations at “The Future of High Tech”, an event organized by the science park management.

The interviews that were conducted were semi-structured, which means that they were a mixture of questions that have been developed before the actual interview and questions that were asked in the context of the interview. Hence the interviews were more similar to a conversation determined by the interviewer than static formulated questions. The questions that were asked were mostly open-ended questions, but also some yes-or-no questions in combination with following question which had the aim to specify and clarify the answer if the interviewee.

3.3 Concepts and Operationalization

The main concept of the study is the one of proximity. Proximity is further divided into five different nominal dimensions of the concept, geographical, cognitive, organizational, social, and institutional. In order to be able to measure these dimensions and finally the concept variables have been developed to define them. These variables can be found in the table below.

Table 1

Dimension of the Concept	**Variables**	**Methods to build proximity**
Geographical proximity	Spatially close, on the same campus	Events, affordable rents for offices and laboratories
Cognitive proximity	Same knowledge basis, same norms,	Mediation departments
Organizational proximity	Time-scale mismatches	Mediation departments
Social proximity	Close personal relationships, good personal basis	Events
Institutional proximity	Specific actions undertaken by one of the institutions, institutional framework and structures	Business departments

3.4 Methods for Data Analysis

Answering the research question will be done by an analyzation of the basis of the five dimensions of proximity with the help of the developed variables.

The type of qualitative data analysis which is going to be used is the narrative analysis. This implies a reformulated and shortened version of the stories presented by the different interviewees. Although, only four stories are going to be presented in chapter four due to their primary relevance for answering the research question in addition to own

observations. In chapter five, the collected data is going to be presented by identifying the variables and by a transcription of what was said to the five types of dimensions of the concept of proximity.

4 Case Study

The following chapter contains an introduction to the Kennispark Twente and an overview about all five cases of company A, company B, student C, and student D as well as about the event “The Future of High Tech”. These five cases are going to be presented on the basis of their expiration, their problems and their final situation.

4.1 Introduction to the Kennispark Twente

About 400 companies are located in the science park Kennispark with about 6300 employees and additional 3000 positions at the University of Twente. Furthermore, it was described as Best Business Park in the Netherlands in the year 2013 and 60 to 70 new startups develop by students of the University of Twente and Saxion University of Applied science which is also located in Enschede and one of the founders, however the focus of the case study will only lie on the University of Twente as a representative for the academic part (Kennispark Twente, Facts & Figueres, 2016).

The University of Twente has 10,000 students and 3,200 employees. It is a technical university with a specification in the fields of Biomedical-, Nano-, and Information Technologies as well as in the fields of Governance and Behavioral Sciences. The University of Twente is the most entrepreneurial university of Europe and is known for the transfer of scientific knowledge to the business sector and for the high number of spin-off companies (Kennispark Twente, Facts & Figueres, 2016). Because of the reasons that the University of Twente and the Kennispark are well known for their innovative performance the Kennispark was selected as a case for the observation of the reduction of barriers hindering the collaboration between the business sector and the academic sector. Additionally, it was chosen for practical reasons in order to have the possibility to conduct face-to-face interviews with representatives of the science park management, researchers of the

University of Twente and entrepreneurs of companies which are located in the Kennispark Twente.

4.2 Company A

Company A was formed by a former student of the University of Twente on the basis of the specialization of a research project. After the formation of company A, the company started a research project together with the University of Twente. The first main problem was the time period. The project was set for a time span of four years. For company A this was a problem because company A wanted short-term projects with a fast development to stay competitive due to new innovation. Staying competitive facilitates making profit relatively immediately after the developed innovation. The Ph.D. student and the other researchers of the University of Twente needed to have a long-term research project in order to get the publications which they need to be successful and to get the academic recognition. The second main problem was that company A was the forerunner at that specific field and the expert for a particular problem whilst the research team of the University had more abstract than practical knowledge and therefore not important for company A. The additional problem was that company A had the impression the research team's goal was the development of generic knowledge instead of innovation knowledge. These divergences lead to a consideration of a termination of the collaboration.

When company was a new startup company, they contacted the science park which helped company A to broaden their professional network consisting of other companies and the university. Company A uses this network at the moment of the conducted in order to find a new suitable partner. Even if the mentioned cooperation was not successful, company had excellent experiences with the science park in general.

4.3 Company B

Company B is a spin-off of the university as well as company A. It was also founded by a former student together with an employee of an already existing company located at the Kennispark Twente in the year 2009. After he has done his PhD, the first founder of the company participated in a research group. Due to the aspect that the professor of that

research group and he had the same knowledge background and the same research field, they started a development of a new concept. This concept was presented to a company of the Kennispark Twente and which supported the new concept with financial means. The actual realization of the concept and the development of the product was then done together with a PhD student and a postdoc of the university. Due to the fact that the testing of all new products were successful, company B was founded. In the year 2010 the mentioned employee joined company B. After another further development, company B was able to present their achievements to potential customers and, additionally, created their own laboratory at the Kennispark Twente with the help of the science park management by providing financial support and, additionally, by handling created intellectual property in cooperation with the Business Development department of the Kennispark Twente. At the moment, company B is working together with students of the university who do research for their usage and for company B.

4.4 Company C

Company C, a company for energy saving building, of the ecosystem Kennispark Twente went to the science shop, an institution of the science park management, because the company had a specific problem on which research should be done. The science shop then mediated a student of the University of Twente with company C. After the successful mediation, the student visited company in a regular time period and did research for company C and got credits in return. During these meetings compiled work has been discussed as well as further developments and ideas. In this case, some problems concerning organization arose due to the different goals the two stakeholders had. Company C wanted to solve the problem which occurred in order to proceed in their development and to be able to make profit. Whereas the student wanted to get credits for the assignment the student did. The problems which occurred between company C and the student have been solved by an alignment of goals.

4.5 Company D

Company D had a project, company D needed help for. So, company D went to the science shop to get a suitable partner who is able to conduct the project. The employees of the science shop then arranged a connection between company D and a student of the University of Twente. The problem of this case was the missing trust of company D in the abilities of the student. Company D was skeptical about the work attitude and the work practices of students in general and was hence skeptical if the university student could create the wanted result. As a measure of this problem, regular meetings have been arranged. During these meetings discussions took place to clarify the procedure and the outcome of the project. Furthermore, the skepticism of company D concerning the student's abilities has been removed by conferences in which progress and development have been debated.

4.6 The Future of High Tech Event

The event "The Future of High Tech" took place at the 25th of March at the campus of the University of Twente in the Waaier building at Drienerlolaan 5 in Enschede. The event started at 10:00 am with an introduction of the director of the science park management. After the introduction, a session was scheduled with several presentations of different speakers for instance representatives of different companies who presented those as well as their products, ideas and developments. The next part of the program were the attendance of two different so-called breakout sessions. The participants could choose between various topics according to their personal and professional interests. The last point of the official program was another session with an award ceremony. Between the official program points a number of breaks took place with a time period ranging from half an hour to one and a half hour. During these breaks food and drinks have been served and these breaks created the possibility to talk with other participants and hence to make new connections and to expand their network. Additionally, booths of companies of the ecosystem Kennispark Twente have been arranged in the socialization area used for the breaks. At the beginning all participants got badges in different colors which all stand for a specific category, for instance "Entrepreneurs", "Investors", "Startups" and "Others".

“The Future of High Tech”: Networking and socializing during a break

In the section above the cases of University-Industry cooperation and their procedure of the collaboration, so the problems and the results, as well as the way the involved actors have been mediated, and have been presented. This description of the cases was a helpful step for the next chapter, chapter five, and the analysis which is going to be conducted.

5 Analysis

5.1 Introduction

In this section, the presented cases of the previous chapter are going to be analyzed on the basis of the theory of chapter three. Hence, the cases are going to be examined according to the five types of proximity of Boschma (2005) which can be found.

5.1.1 Company A

Company A can serve as evidence for various kinds of proximity that were built. On the basis of the conducted interview of section 4 one can see the presence of three kinds of proximity.

Firstly, geographical proximity. The offices of company A is located in the Gallery which is approximately a ten minutes' walk to the research group of the University of Twente with which they have this collaboration.

Secondly, institutional proximity was built. With the help of the science park company A formed a very broad network with various local actors which they are also working with during the beginning of their formation. This network also consists of partners from the university. Additionally, the cooperation with the science park management enabled them to understand the importance of the cooperation with the academic sector to use current research in order to proceed with innovation and hence to be able to meet their needs for making profit.

Thirdly, cognitive proximity has been built through the Future of High Tech event. This type of proximity was experienced by a personal observation. The event created the opportunity to approach for an interview without being rejected because of the minimized distance between the university and the business sector.

5.1.2 Company B

Even if no particular barriers hindered a successful cooperation in the case of company B, various types of proximity have been created.

First, geographical proximity has been created due to the fact that company B is located at the Kennispark Twente, and more specifically, at the High Tech Factory, which is directly at the campus of the University of Twente and spatial close to researchers and other academic stakeholders. This is possible due to the relatively low rents which gives small start-ups the chance to participate in the ecosystem of a science park.

In addition to that, it is a good example of how cognitive proximity can support development. The professor with whom the first project was initiated had the same knowledge background and, hence, also the same "language".

Furthermore, institutional proximity is present due to the aspect that the institution science park supported company B and its development as well as further and co-created research through financing the laboratories of company B. institutional proximity was also there due to the network that the founder of company B had. However, this network cannot only be seen as institutional because of the good personal relationship between him and the professor. Therefore, the network also had a social component and, hence, social proximity was present the development of company B and it also contributed to a certain extent to the creation of company B.

Fourth, organizational proximity can be found in case of company B because no mismatches for instance time-scale mismatches or different goals for instance profit and publishing were present in the cooperation of company B with other partners.

Hence, it can be said that in the example of company B all types of proximity can be found.

5.1.3 Company C

The science shop functioned as a mediator in that specific case and created a connection between company C and the student of the University of Twente. Hence, institutional proximity was present, because this mediation was conducted by an institution of the ecosystem science park. Second, due to the successful connection, cognitive proximity can also be found. Namely, through this mediation, two participatory actors with the same professional background and the same tacit knowledge. Third, geographical proximity, was as well as in the previous cases, also there, because of the fact that company C and the building of in which the student was located, were both on the campus of the University of Twente. Hence, the two stakeholders were spatial close with walking distance of twenty minutes maximum. Fourth, organizational proximity, which was first absent has been created, namely by the alignment of the different goals of company C and the student and both stakeholders were still able to benefit from the situation.

5.1.4 Company D

In case of company D, one can see evidence for geographical proximity, because company D is located at the campus of the Kennispark and so is the student who did the project for

company D. Hence both actors were spatially close to the each other. Furthermore, institutional proximity is present in that case, because the science shop which is an institution of the science park played an important role because of its role as a mediator between the academic sector and the industry sector. Additionally, in that specific situation, institutional proximity influenced the presence of cognitive proximity. First, due to its mediation and hence to find partners which are suitable for the needs of the company and second due to all the meetings which took place to find a common basis about the procedures and the result.

5.1.5 "The Future of High Tech" Event

"The Future of High Tech" confirms the claim that social events can build proximity. First, geographical proximity was built because the event brought people from various regions together in one place. Although, the geographical proximity was only created for a short time period it gave all participants the possibility to get connected with other actors and to make further connections for new possible collaborations.

Second, social proximity has been created. Through the breaks which were arranged between every section, a relaxed atmosphere was created simplifying the development of personal trust and social relations.

Third, one can see evidence for cognitive proximity. This event creates the possibility to find partners with the same knowledge background and the same attitude.

The fourth type of proximity which was created by this event is institutional proximity, because it was organized by the institution of the science park management and was, hence, a result of the institutional framework of the science park ecosystem.

Fifth, organizational proximity can also be build. Just like for cognitive proximity, it is also possible to not only find a partner with the same work attitude and knowledge background but also the right one for a project with an certain time frame.

In this section, the cases have been analyzed according to the present proximity and it can be said that in all five cases, several types of proximity have been created due to the science park and its actions.

5.2 Proximity Table

In the table below, the types of proximity which were present or have been built during the event or the other processes of University-Industry cooperation are shown.

Table 2

	Company A	Company B	Company C	Company D	Event E
Geographical	x	x	x	x	x
Cognitive	x	x	x	x	x
Organizational		xx	xx		x
Social		xx			xx
Institutional	xx	x	xx	xx	xx

x = created proximity

Table 2 serves as a summary of the present forms of proximity in each case. So every cross stands for the level concerning the five types of proximity. That means that the amount of crosses is also used to show the importance and the influence each kind of proximity has in the five different cases. So, two crosses then are stating a high effect on the existing cooperation or possible collaborations and an important importance of the future development. One can see that geographical proximity can be found in the all five examined cases due to the fact that all involved partners are located close to each other or are, in the case of the event, at least brought together for a certain time period. Cognitive proximity is also present in all five cases, as well as institutional proximity. Furthermore, institutional proximity plays a very important role on the case of company A, company C, company D and the event E. This means, the science park as an institution was essential for the development for three of the four firms and helped them in a very substantive way to create their own network and to proceed with their progression. As already mentioned the focus of the paper

lies especially on the organizational and the social proximity. Therefore one can say that the organization of business events can support the creation of social proximity which plays also a crucial role for the evaluation of a firm as one can see in the case of company B. In the case of company B social proximity was one of the most important influential factors of the creation of the company. As well as the presence of organizational proximity.

6 Discussion

The new discoveries which have been found in chapter four and chapter five are going to be discussed in the following section. This section is divided into two different parts. The first part is going to cover the two sub-research questions a) How has the situation been at the beginning and what were the needs of the participatory actors? and b) How did the science park management contribute to a reduction of the distance between the University of Twente and the businesses and create proximity?. The second part consists of a generalization, of how the science park management can create proximity.

6.1 Answer to the Sub-Research Question

a) How has the situation been at the beginning and what were the needs of the participatory actors?

In case of company A, the starting situation was that the partner, a research team of the University of Twente, of company A was not suitable due to various mismatches. The first mismatch was the time period for the project. The second mismatch was concerning the knowledge which was more specific and abstract than the knowledge company A needed. Hence, the needs of company A were a suitable partner for a short-term time period for a successful cooperation and a partner who has the same knowledge basis or rather more practical knowledge which company A can use for its further development and progress.

As mentioned above, company B did not have problems in a cooperation and is an excellent example of a successful start-up. However, the need of company B were the following. First, company B needed the access to the university to be close to research production of the

University of Twente, second, company needed financial support for laboratories to be able to conduct further research and for developed intellectual property to pay for the patent of their intellectual property.

Student C needed a company she can cooperate with in order to be able to conduct research and to have a topic she can write her assignment on. The situation is similar for student D who wanted to find a company he can cooperate with, however for a shorter time-period in contrast to student C.

b) How did the science park management contribute to a reduction of distances and create proximity?

First, the science park management helped company A by creating geographical proximity due to its location on the campus of the University of Twente. This geographical proximity enhances the possibility to cooperate with researchers of the UT. Furthermore, the science park management created cognitive proximity by organizing events such as the "Future of High Tech" which creates the possibility to find new partners of the same knowledge field. Additionally, the science park management created institutional proximity, by helping company A to get a broad network and contacts. On the basis of this network it will relatively simple for company A to find a better and more suitable partner.

Second, in the situation of company B the science park management created proximity by providing financial means for the laboratories of company B in which the company conducts research together with the help of students of the University of Twente. Furthermore, the science park management created geographical proximity due to the aspect of low rents. This enables also small companies to have access to a broad network consisting of other companies and the University of Twente as academic institution. Based on the creation of geographical proximity, cognitive, social, and organizational proximity have then been created in an indirect way by the science park management. Because of the spatial proximity of company B it was possible to fall back on an already existing network. The founder of the company was able to cooperate with the professor of the University of Twente who has the same tacit knowledge, the same aims and with whom he had a good relationship.

Third, in the cases of student C and student D, the science park management contributed to a reduction of the distance through its institution of the science shop. The science shop functioned as a mediator between the University of Twente and the business by conveying two partner on the basis of their needs and the potential solution due to a suitable cooperation. Hence the science shop brought student C and student D together with companies of the Kennispark Twente.

Fourth, by organizing events such as the Future of High Tech, the science park management contributes to a reduction of distances between the University of Twente and the business sector. These events create geographical proximity because it brings people from various locations together to one spot. Furthermore, social proximity has been created by the informal and casual atmosphere of such an event. This simplifies the building of new connections and to find new partners with the same knowledge basis but also with the same way of thinking. The last type of proximity which will be created is institutional proximity.

6.2 Generalization

Although this paper only gives an exploration of the University-Industry cooperation and ways the science park management can improve this cooperation, this section gives a small summary and generalization.

First, it can be said, the existence of specialized departments that support startups, for instance the business development department or the science shop can create proximity and hence contribute to an improvement of the University-Industry cooperation. These departments are useful for companies which do not have the knowledge to initiate the process of patents and do not have the financial means to pay for these and for companies who do not have an extended network yet to find a suitable partner for a cooperation.

Furthermore, the general creation of networks and connections with various actors, including the university also creates proximity.

Moreover, it was found the events which are organized by the science park management can additionally help the University-Industry-Cooperation due to the aspect of proximity creation which takes place at these events through the unification of various parties which otherwise

would not have been close. Furthermore, it can be emphasized those events enable a possibility for the different stakeholders to strengthen these different types of proximity by creating an environment in which they can exchange their views, build up personal trust. It can further serve as measure to build up new partnerships. As one can see in the table in section 5.2 such events can create all five types of proximity and are hence a useful measure.

7 Conclusion

The main research proposition of this paper was an exploration based on the case study of the Kennispark Twente of the way the science park management can improve the University-Industry-Cooperation by creating proximity. The research has shown that the management of science parks can contribute to an increase of the collaboration between the university and companies, by specifically organize events at which the two actors can get in touch and have the possibility to get partners for projects and for further R&D. With the help of these events several types of proximity between universities and companies can be created. Moreover, it was analyzed, the creation of specific departments, which are responsible for mediation of project partners of the two actors or the provision of support, is another factor that can create proximity and, hence, improve the University-Industry-Cooperation.

Science parks can contribute to economic growth and progress as well as development by creating jobs and wealth in a region if their performance is efficient and effective (Ratinho and Henriques, 2010). The indirect effects of a successful science park such as an increase in the employment rate, regional economic performance for instance a rise of the regional GDP and a decrease in the regional debt level will lead to an overall regional growth of wealth. Therefore it is of essential relevance for regional stakeholders to understand to how science parks can improve UIC in order to provide a general improvement of the performance of the science parks and therefore of the overall region which can hence contribute to the reduction of a societal problem. Therefore the aim of this paper was to explore what can be enhanced in the cooperation of universities and businesses and to determine actions that can be taken in order to improve the performance of a science park and to create a basis which further research can be conducted on to contribute to a prosperous progression and

growth of a specific region and therefore contribute to the society and to the citizens of that region.

As mentioned the topic plays an important role for the evolution of a region and has therefore an important societal relevance. This paper aims at contribute to that social issue by paying additional attention to social and organizational proximity. An exploration of the University-Industry cooperation is provided on the basis of four different firms of the Kennispark Twente and on the basis of an event organized by the science park institution is given in this paper. The scientific contribution hence lies on the beginning of the first examination of these two types which have not been analyzed in the past by previous studies.

However this case study, only provides the beginning of a whole field which can be researched on due to limitations of respond from possible interview partners as well as because of timely reasons. Concerning a future outlook, it would be useful to deepen the research on the field of proximity creation, especially the creation of organizational and social proximity, in order to be able give an explanation for successful University-Industry cooperation and then to be able to strengthen the regional development.

7.1 Personal Reflection

Concerning a personal approach of the paper a broader time period would have simplified the work. However, this was because of lack of response to the first chosen topic which lead to a relatively late change of the research field. Due to the missing time, it was not possible to further deepen the own case study and to add further companies and other involved stakeholders to get a more generalizable outcome. Although, even if various approached parties did not respond for interview requests, the science park management of the Kennispark Twente surprised in a personal way. It was assumed the science park management would be quite distanced from the rest of the ecosystem of a science park. However, the opposite was the case and it was simple to include this essential stakeholder in the research because of the quick and accommodate response which also further supports the made observations concerning its ability to create proximity between different actors.

On the basis of a personal reflection, it can be said that the thesis definitely influenced the personal way of development and the professional direction. However, not specifically in the direction of science parks but in the general direction of management and the coordination of various participatory actors.

8 References

Antonelli, C. (1995). The Economics of Localized Technological Change and Industrial Dynamics. *Kluwer*, Dordrecht

Antonelli, C. (2000). Collective knowledge communication and innovation: the evidence of technological districts, *Regional Studies* 34, 535–547

Audretsch, D. B. and Feldman, M. (1996). Spillovers and the geography of innovation and production, *American Economic Review* 86, 630–640

Benneworth, P., Ratinho, T. (2014). Reframing the role of knowledge parks and science cities in knowledge-based urban development. *Environment and planning*

Bennewoth, P., Ratinho, T., Korotka, M. (2014). The role of universities in innovation networks: the role of proximity on innovation dynamics in knowledge community precinct *UT Publications*

Bigliardi, B., Dormio A.J., Nosella A., Petroni G. (2006). Assessing science parks' performances: Directions from selected Italian case studies. *Technovation* 26, 489-505

Boschma, R. A. (2004). Competitiveness of regions from an evolutionary perspective, *Regional Studies* 38, 1001–1014

Boschma, R. A. (2005). Editorial: Role of Proximity in Interaction and Performance: Conceptual and Empirical Challenges, *Regional Studies*, 39(1), 41-45, DOI: 10.1080/0034340052000320878

Boschma, R. A. (2005). Proximity and Innovation: A Critical Assessment, *Regional Studies*, 39 (1), 61-74, DOI: 10.1080/0034340052000320887

Boschma, R. A. and Lambooy, J. G. (1999). Evolutionary economics and economic geography, *Journal of Evolutionary Economics* 9, 411–429

Caniëls, M., C. J., Kronenberg, K. & Werker, C. (2014). Conceptualizing proximity in research collaborations. *The Social Dynamics of Innovation Networks,* London: Routledge, 221-239

Cohen, W. M. and Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning an innovation, *Administrative Science Quarterly* 35, 128–152

Colombo, M.G., Delmastro M. (2002). How effective are technology incubators? Evidence from Italy. *Research Policy* 31, 1103-1122

Cooke, P. and Morgan, K. (1998). The Associational Economy. Firms, Regions, and Innovation. *Oxford University Press*, Oxford

Etzkowitz, H. (2008). The Triple Helix: University-Industry-Government Innovation In Action, London: Routledge

Fromhold-Eisebith, M. (2014). *The Social Dynamics of Innovation Networks*. *Regions and Cities.* Taylor and Francis

Gilly, J. P. and Torre, A. (2000). Proximity relations. Elements for an analytical framework, in Green, M. B. and McNaughton, R. B. (Eds) *Industrial Networks and Proximity*, 1 –16. Ashgate, Aldershot

Gordon, I. R. and McCann P. (2000). Industrial clusters: complexes, agglomeration and/or social networks, *Urban Studies* 37, 513–532

Hansen, M. T. (1999). The search-transfer problem: the role of weak ties in sharing knowledge across organization studies, *Administrative Science Quarterly* 44, 82 –111

Jaffe, A. B., Trajtenberg, M. and Hinderson, R. (1993). Geographic localization and knowledge spillovers as evidenced by patent citations, *Quarterly Journal of Economics* 108, 577–598

Kennispark Twente (2016). *Facts & Figueres.* Retrieved May, 5, 2016, from http://www.kennispark.nl/factsfigures/

Kennispark Twente (2016). *Science Shop brings expertise UT and Saxion within SMEs*. Retrieved June, 14, 2016 from http://www.kennispark.nl/innovate-accelerate/science-shop-brings-expertise-ut-and-saxion-within-smes/

Kennispark Twente (2016). *Science Shop doubles innovation with SMEs*. Retrieved June, 10th, 2016, from http://www.kennispark.nl/news/11473-egbert-van-hattem-science-shop-doubles-innovations-within-smes/

Kirat, T. and Lung, Y. (1999). Innovation and proximity. Territories as loci of collective learning processes, *European Urban and Regional Studies* 6, 27 –38

Lindelöf, P., Löfsten H. (2003). Science Park Location and New Technology-Based Films in Sweden – Implications for Strategy and Performance. *Small Business Economics* 20, 245-258

Lundvall, B. A. (1993). Explaining interfirm cooperation and innovation. Limits of the transaction-cost approach, in Grabher, G. (Ed.) The Embedded Firm. *On the Socioeconomics of Industrial Networks*, 52 –64. Routledge, London

Malecki, E. and Oinas, P. (Eds) (1999). *Making Connections. Technological Learning and Regional Economic Change*. Aldershot, Ashgate

Maskel, P. (2001). Towards a knowledge-based theory of the geographical cluster, *Industrial and Corporate Change* 10, 921–943

Maskell, P. and Malmberg, A. (1999). The competitiveness of firms and regions. 'Ubiquitification' and the importance of localized learning, *European Urban and Regional Studies* 6,9 –25

McAdam, R., Keogh, W., Galbraith, B., Laurie D. (2005). Defining and improving technology transfer business and management processes in university innovation centers. *Technovation* 25, 1418-1429

Nooteboom, B. (2000). Learning and Innovation in Organizations and Economies. *Oxford University Press*, Oxford

Perez, C. and Soete, L. (1988). Catching up in technology: entry barriers and windows, in Dosi, G., Freeman, C., Nelson, R., Silverberg, G. and Soete, L. (Eds) *Technical Change and Economic Theory*, 458–479. Pinter, London

Ratinho T., Henriques E. (2010). The role of science parks and business incubators in converging countries: evidence from Portugal, *Technovation* 30, 278–290

Simon, H. A. (1955). A behavioral model of rational choice, *Quarterly Journal of Economics* 6, 99 –118

Yin, R. K. (2003). Applications of Case Study Research, *Sage*, Thousand Oaks, CA

Yin, R K. (2003). Case Study Research: Design and Methods, *Sage*, Thousand Oaks, CA

Zukin, S. and DiMaggio, P. (Eds) (1990). The Social Organization of the Economy. *Cambridge University Press*, Cambridge

9 Appendix

The following section gives an overview about the questions which have been asked during the interviews. However, the interviews were semi-structured, hence the questions have been add with various further questions depending on the answers of the interviewees. The catalogue listed below provides all questions, although not all have been asked in every interview but they depended on the position of the interviewee.

9.1 Interview Questions

1. Which local/regional policy initiatives do you evaluate in the past years as relevant for the development of the Kennispark?

2. Could you describe the effect and potential success of these policy initiatives?

3. Which policy instruments were used?

4. How would you describe the current development of the Kennispark Twente?

5. What was achieved until now in your opinion and what needs to be targeted in the next years?

6. Which are the key success factors of the Kennispark?

7. Which are the most significant weaknesses of the Kennispark science park?

8. With whom are you collaborating within the Kennispark community?

9. Could you mention any barriers in the collaboration between the academia, business and public sector in the setting of the Kennispark? (Examples)

10. Does a collaboration exist between the UT and your company/organization? → If so, how does it look like?

11. How would you describe the impact of the UT on your company/organization?

12. How do you evaluate the influence of the SP management team on your company?

13. How do you evaluate the influence of the regional legislation on your company / organization?

14. With which specific policy initiatives are you creating proximity between the University of Twente and local companies located in the Kennispark?

15. How was the starting situation? What were actions that have been taken? What were the outcome and results of the actions?

16. What are / were barriers that hinder the creation of proximity? If there were barriers of proximity, how have they been tackled by the management of the science park?

17. What are policy instruments in order to solve the problem of proximity?

18. What are projects that have a successful development (so: first difficulties and then successful or at least better functioning) → concrete examples

19. Are there factors that can be further improved? If yes, what specifically can be further improved?

20. Are there any obstacles that hinder the implication of these actions / policy initiatives?

21. Is there a common knowledge base (in order to better handle the problem of the lack of cognitive proximity)?

22. How is the knowledge transferred between the university and the company?

23. Example of one company → lacking trust in science park management? How can the lack of institutional proximity be solved? So, that trust of the firms can be created

24. Who are the stakeholders in these projects? (Side of the University and side of businesses)

25. To what extent are you cooperating with the University of Twente?

26. What do you co-create with the University of Twente? → Projects?

27. Have there been barriers / obstacles that hinder(ed) the cooperation with the UT? (Especially: Have there been barriers of proximity?) If yes, which and have they been solved? If they have been solved, how? → was the science park management involved?

28. How was the situation afterwards? And what were the results?

29. Who is involved in these projects? Researchers? From the side of the UT and from the side of the company?

30. What is the project about?

31. Have there been any problems with finding the right partner for the cooperation? How did you find the cooperation partner?

32. Have there been / are there any other problems concerning the collaboration? → So problems concerning

- Time scale mismatches?
- Social trust / social relations?
- Different goals?
- Policies (of the kennispark) hindering a successful cooperation?

33. If yes, what have you done in order to solve these problems?

34. What was your contribution to the solution?

35. What was the contribution of the other party?

36. Can the cooperation be further improved?

37. Was the science shop involved?

38. 12. If yes, how and to what extent?

39. Have there been other institutions of the science park which have been involved?

40. If yes, which institutions?

41. If yes, to what extent have they been involved? Specific actions?

Summary of the conducted Interviews

Interview with Pieter Dillingh

Kennispark was founded as innovation platform with smaller projects. Then measurements have been developed in order to support small startup companies, for instance money, coaching and consultancy. Before three years the Kennispark Twente, like it is today, was introduced by merging the Kennispark with the innovation platform and all different parts were combined into one organization. It was very important for them to invest into the strengths of the different factors through several policy initiatives. One of the positive effects, was that projects were subsidezed then and could develop in a shorter time period. The investment was about 275 Mio which was partly financed by private companies. After that private companies also started to invest in their R&D. The Kennispark management further organizes around 150 events per year in cooperation with partners. Additional instruments of the Kennispark management in order to support are financial means, consultancy, for instance support concerning business development. Pieter Dillingh described the Kennispark Twente as a platform with different organizations with an equal background and which have the same goals for instance the University of Twente, Saxion University of Applied Sciences, and the business development agency. With the help of the 275 Mio the Kennispark developed about 80 projects with smaller sub-projects concerning system development and product development as well as commercialization of knowledge. Furthermore, the Kennispark management is currently facing a project about Dutch and German companies in order to strengthen the cooperation between these two countries. Another important aim of the Kennispark management is the development of a well-

functioning ecosystem because, according to him, companies are in need of such an ecosystem in order to be able to do the next step and to develop themselves. Due to the globalization and the rapid changes of the world economy, it is of essential importance that companies cooperate and invest in open innovation to take part in that globalization process and economic growth. Therefore, is indispensable for the science park management to think about the future progress and development to measures to stay competitive ad try to create new projects for the companies of the Kennispark Twente. These projects are rather general and the companies can enroll for these projects and develop smaller projects which are often done in cooperation with the University of Twente. One big project of the Kennispark Twente is the cooperation with Fraunhofer, Europe's largest non-profit organization for applied research, with an establishment of a Fraunhofer Project Centre for 'Design and Production Engineering in Complex High-Tech Systems'. Moreover, the Kennispark Twente wants to face projects of the development of new technologies for instance in the field of connected systems, a cooperation of different organizations with the goal to grow and to generate new jobs.

Moreover, one of the most important tasks of the science park management is the reduction of barriers between companies and the University of Twente. It is often the case that companies, mostly SMEs, do not know how to get connected with the University of Twente. Pieter Dillingh mentioned that a positive development concerning the cooperation with the university can be found especially of medium-sized companies with about 250 employees. However, as already mentioned, it is difficult for both parties to find the right partner for a project or and innovation process. Hence, the Kennispark Twente tries to function as a mediator between those two parties. Therefore the science shop was established to mediate companies with the University of Twente. Every time there is a different and individual approach in order to see what the company is looking for and which partner will be the best one concerning knowledge and skills in order to support the company.

Interview with Marit Colijn (E-Mail Interview)

1. What is your project about?

My project was about applying energy saving measures in vacant buildings. This was mainly focused on office buildings, because this were the buildings the company managed. The energy saving measures had to help sell the buildings, or give it a better energy label.

The company was a real estate management company, which was focused on managing vacant buildings, during the period the owner was trying to sell the building.

2. Which company are you working together with? / Who else is involved in the project?

I was mainly involved with the director of the company, who supervised me. But I also talked to his employees who showed me around in some vacant buildings. Egbert van Hattem and Bram Entrop (a lecturer of the UT) were also involved, but mainly as supervisors for my assignment.

3. Have there been / are there any problems concerning the collaboration?

No, I visited the company regularly to show them what I had done and to discuss our ideas.

4. Have there been any problems with finding the right partner for the cooperation? How did you find the cooperation partner?

The partner came with his research question to the Kennispark and trough Egbert we were brought into contact.

5. So, are there any problems concerning

- Time scale mismatches?
- Social trust / social relations?
- Different goals?
- Policies (of the kennispark) hindering a successful cooperation?

For the company it would have been better if the assignment was performed in a shorter time scale. I was available for 2 times 5 EC over 2 quartiles, and they preferred a shorter period, but in the end it worked out fine.

I did clearly see different goals of the company and for me. They just wanted a solution for their problem and I also had to meet learning goals.

Next to this, it was difficult for me, the company was only focused on earning money, while I was idealistic about improving the world by applying energy saving measures. In the end I could combine these goals by concluding that even if they only want to earn money, this can also help improve the world.

(Also answer to question 6 and 7)

6. If yes, which problems have occurred?

7. If yes, what have you done in order to solve these problems?

8. What was your contribution to the solution?

I think we both did concessions and solved the problem in that way.

9. What was the contribution of the other party?

10. Can the cooperation be further improved?

The cooperation could have been further improved by having more meetings with the company, but this was very time consuming for me and for them.

11. Was the science park management / especially the science shop involved?

Not really, Egbert was sometimes present with meetings and had some ideas, but the collaboration was mainly between me and the company.

12. If yes, how and to what extent? Actions that have been done by them…

Interview with anonymized company

The company is cooperating with the University of Twente in a quite intensive way. Several researchers, e.g. a professor and a PhD, are at their company about two to three times a week, because they are cooperating product together. However, it is not clear in which direction the product is going to develop. Furthermore, the research team has an

assignment for four years, although, it is not clear where the company will be in four years. Additionally, the research team is too expensive in the eyes of the interviewee in comparison with the results because due to him they are not doing what the company is asking for. Furthermore, it is said the research team does not have knowledge which helps the company with the development, due to him the employees of the company have more knowledge about the topic than the researchers. So, they are currently looking for other parties in order to replace this specific research team. It is also the case that the goals of both parties are different, for instance the research team wants to publish whereas the company wants to make profit. Furthermore, the interviewee said that both actors have a different work ethic. According to him, the employees of the company work very hard and do extra hours, whereas the research team is, in his view, relatively lazy and he said they would take days off. Furthermore, it is said that the communication is missing, although in his view communication would not help because the opinions and goals are too far apart, and it is a complete mismatch according to his words. Therefore, the company wants to find a new partner with the help of the network they have. He said that they knew what they are looking for, now and can therefore prevent the problems they have at the moment.

However, the opinion concerning the science park management is really positive and it was said the management helped the company a lot during their early stage as a startup. Due to their help the company could build up a broad network. Furthermore, the company often participates at events of the Kennispark, for instance at the Future of High Tech. The interviewee further said the science park management does a lot and are open for a lot of ideas and suggestions as well as that they are open to help with anything, if you have problems.

Interview with Chris Roeloffzen

Chris Roeloffzen started as PhD student in 1998 until 2002 and his work was related to integrated photonics and computer chips. In the same year he moved to another group at electrical engineering, telecommunication engineering, and this professor had a background concerning photonics, namely in optical communication. Both had the idea to make a special chip for antenna with photonic processing in 2003/2003. At the same time he had

connection with another company, a spinoff of the University of Twente, LioniX, located at the gallery. He introduced the concept to the LioniX and they were very interested and decided to get some funding for the realization of the idea. So, in this year they submitted to proposals which were granted, so he could immediately start with the project as an assistant professor together with a PhD student and a post-doc. They did the total design, e.g. the functional design, and the analysis of the two chips. They also tested the chips, one for radio communication and the other one for satellite communication in a plane. Together with NLR they made a complete antenna system with their chip and also tested at the NLR. The other chip was developed together with Astron. Both projects were successful and then, he and the CEO of LioniX decided to create a new company, so Satrax. By the end of 2009 Statrax was founded. However, he was only the technical mind, how he called himself, so he needed a partner. Hence, Paul van Dijk started working for Satrax at the beginning of 2010. Then the two of them started the company. Chris Roeloffzen was still employed at the university of Twente and Paul van Dijk at LioniX, because Satrax did not have money at that time and they started to write another project proposal, for the next generation of the chip which was also granted. The project ended about two to two and a half years ago and they could go the customers and present the chip. They applied for a loan of the province of Overijssel and could combine that loan with the High Tech Factory and could hence create an own laboratory at the High Tech Factory. Afterwards, Chris Roeloffzen moved from the University to Satrax, approximately one and a half year ago, which was then located at the building of the High Tech Factory. When he moved to SATRAX B.V., they were able to hire three more people and were then 5 people in total.

According to him no problems arose during the cooperation with LioniX when Chris Roeloffzen cooperated with them, due to the common attitude and believes. He said that LioniX was still a young company and was therefore also still interested in R&D and are highly related to research programs at the University of Twente, so the individual goals were compatible. The idea, or the functionality, of the chips is intellectual property of the PhD students who were employed by the University of Twente and can therefore be published. That was normally the case, so that the researchers of the University of Twente published their results. Except for the last project, which he was talking about, they had a system level idea and together with all involved groups, so the University of Twente and all project

partners, it was decided to patent the idea. Then Roy Kolkman of the Business Development department of the Kennispark was contacted and helped them to get the contacts for a pre-research, to look if the idea is patentable. This department provided sufficient funding for Satrax to be able pay for the patent, which was between 16 000 to 20 000 Euro. The patent was also granted.

The science park management supported them for example with their department at the High Tech Factory and that they could do research in the laboratories which cost several hundred thousand Euro. The science park management payed for these laboratories and SATRAX B.V. pays the money in small rates. They also attended at the event of the Young Technology Award and together with Scintilla, the study association of electrical engineering the science park management organized another event. They are not hindered by the science park but by policy initiatives of the University of Twente. This was the case in a project which he did research for ten years, however the dean decided to stop his research, even if it went well. Although, the CEO of LioniX said he should concentrate on LioniX and if SATRAX B.V. is not successful, Chris Roeloffzen could come to LioniX. However, everything worked out. Also his work in the laboratory was affected, although he could use the laboratories of applied physics and the project, the research and the testing was transferred to applied physics. SATRAX B.V. is also working together with students of the University of Twente who can do experiments at their laboratory. The science park management supported SATRAX B.V. in the beginning as well as supported them in the case of patents. Furthermore, the science park management helps SATRAX B.V. with the movement to the Gallery building because of the merger, at the moment.

Interview with anonymized student

The student who has been interviewed organizes the mediation of students with companies of the region of Enschede for his faculty. So, his task is to search for companies which offer short-term assignments for students. However, according to his experiences it is difficult to find companies which are willing to employ students for a shorter period of time, because of lacking trust concerning the abilities of the students and concerning the missing experience. In order to find a suitable project he contacted the science shop and asked if assignments

are offered by companies. The company they were working with also contacted the science shop to find a student they can work with. Hence Egbert van Hattem made the connection between those two actors with an arrangement at which all three stakeholder, a representative of the company, he of the side of the university, and Egbert van Hattem of the science shop, were present. In the case of this company, the problem was that they first did not believe in the abilities of the student to create the result they wanted to have. Although, that was only during the beginning. The interviewee said, they had several meetings and communication in order to convince the company and to solve that problem and everything went out fine in the end. Furthermore, the interviewed student mentioned they had also a lot of meetings to discuss the result and the product the company wants to have, to ensure compliance with the work process. The same problem was also present at another company which had prejudices concerning the experience and the knowledge of students and concerning the work attitude, which means the company had the opinion research students do not have the same competitive way of thinking and, hence, work attitude.

Based on the statement of the interview this is often the case, hence it is difficult to find short-term assignments for students, even if students have the advantage to be relatively inexpensive. Proximity was build up in the case of the first mentioned company by the science shop of the Kennispark that made an arrangement between the two actors, as well as by the meetings of the student and a representative of the company to discuss about the further approach of the project and to agree on the outcome.