KYMENLAAKSON AMMATTIKORKEAKOULU

University of Applied Sciences

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Kimmo Selviranta

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Tämä lopputyö käsittelee enimmäkseen tiedonsiirtoa ja jakamista korkeamman asteen koulutusyksiköiden ja yritysten välillä. Tutkimuksessa käy ilmi minkälaisia erilaisia muotoja tämä yhteistyö voi ottaa ja minkälaisia ongelmia voidaan odottaa.

Ensin määritellään tieto tätä tutkimusta varten, sekä katsotaan kuinka organisaatiot käsittävät sen. Tiedon sijainti organisaatioissa ja kuinka sitä siirretään onnistuneesti tullaan tarkastelemaan seuraavaksi. Kuinka tällaisia suhteita käytetään hyväksi ja kehitetään tutkitaan myöhemmin tässä tutkimuksessa.

Kolmea korkeamman asteen koulutusyksikköä Tsekin tasavallasta, Saksasta ja Irlannista on tutkittu ja vertailtu tässä tutkimuksessa. Tutkimuksessa käytetyt tiedot on kerätty erilaisista haastatteluista, koulutusyksikköjen itse julkaisemista artikkeleista ja tutkimuksista sekä muista luoduista kontakteista.

Tämän lopputyön päätelmistä käy ilmi, että korkeamman asteen koulutusyksiköiden ja yritysten tulee kehittää yhteistyötään. Vaikka ongelmia on monia, useimmat niistä pystytään joko korjaamaan tai parantamaan.

ABSTRACT

This thesis will handle the transferring of knowledge mostly between Higher Education Institutions and businesses and will look at different ways of how such cooperation can be done and what kind of difficulties might be expected during the transfer process.

How knowledge can be defined and how organisations see it will be looked at first. After this where the knowledge is located in and how the transfer of successful knowledge transfer can be viewed will be discussed. The ways in which to develop these relations between HEIs and businesses will also be examined in this thesis.

HEIs from Czech Republic, Germany and Ireland have been looked at and compared in this thesis. The information gathered of the HEIs comes from various interviews, published materials from the HEIs and other contacts that were made during the research.

The HEIs and businesses need to have cooperation on several levels to develop and gain competitive advantages. The limitations of HEIs need to be considered in this, but the problems that arise from cooperation can often be worked out. This is easiest if it is a long-term partnership.

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1   INTRODUCTION

Cooperation between businesses and Higher Education institutions is an interesting topic as many people go through both institutions. This thesis is made to see what kind of operational cooperation these two separate organisations can do and what kind of limitations they have. As this thesis also looks into the difficulties HEIs and businesses run into in their relationship, also some different ways in which these can be solved have been looked at.

As all HEIs have different ways in which they cooperate with businesses, there are also things that these institutions can learn from each other. As this thesis takes explains how three different institutions from three different countries cooperate with the businesses from their regions, country and international partners, this gives an idea to what kind of different operations HEIs can have with businesses. In general all HEIs have some kind of cooperation with the businesses of its region, but the extend to which these activities go varies a lot from institution to institution.

This thesis also has its limitations. The sample size in itself may not represent a comprehensive understanding of all the various ways of cooperation between HEIs and businesses, but since all the institutions are a bit different and are from different countries, they do give a fairly good assessment of different ways HEIs can cooperate with companies. To get a good assessment of the ways these HEIs cooperate with businesses, multiple interviews from each institution have been made, as well as other published and internal material from these HEIs has been used. Most of the different ways in which these HEIs cooperate with businesses can be translated to the use of other educational institutions in some way.

2 KNOWLEDGE TRANSFER

2.1 Definition

Knowledge can be defined in various ways, always depending on what it is associated with. For the purpose of this thesis, knowledge is viewed as information which is passed on from one entity to another to help them improve their level of awareness, improve their methodology or improve some other aspects e.g. in production. Argote & Ingram (2000, 151) have defined knowledge transfer as: *the process through which one unit (e.g., group, department, or division) is affected by the experience of another*. Basically what they are trying to describe with this is the transition of knowledge from a certain group of people to another. One example of this kind of transition of expertise could be when e.g. a research group from a university is assisting a company on some project they are working with. Another example could be when a division within a company gets an idea from another one in the same company e.g. for a design of a product. For the purpose of this thesis defining the usefulness of knowledge transfer could be defined in the words of the HM Treasury (2003, 31): "*Transferring the knowledge and skills between universities and business and the wider community increases the economic and social returns from this investment.*"

2.2 Measuring successful knowledge transfer

Measuring the successfulness of knowledge transfer can be viewed on different levels. This is because knowledge transfer doesn't only happen on an individual level when a person gets something from someone, but it also occurs on higher levels; such as groups or divisional levels. This also means that the benefits have to be viewed from different angles to see whether the knowledge transfer has been successful, and whether it has been worth it. (Argote & Ingram 2000, 152.)

One thing that makes knowledge transfer easier within a company or organisation is that the people working there are more similar and have more similarities than across organisational borders (Argote & Ingram 2000, 151-152). A good example of this could be when universities work together with companies on certain projects. If the project also includes e.g. lecturers or academics from the school it might be that they don't have much interest on the business side when knowledge transfer becomes harder when the ideas do not meet.

It has also been argued that since knowledge transfer shows in organisations as a change in the level of knowledge or as a change in their performance, the change itself can also be measured just as easily by checking how much the knowledge in the unit has increased or how much their performance has changed. The problem with measuring the change in a unit's knowledge level verbally is that sometimes the recipient is not even aware of the fact that it has gained knowledge. This is why measuring the change on a performance level gives more accurate results than verbal ones. (Argote & Ingram 2000, 152.)

2.3   Knowledge reservoirs

How and where organisations store knowledge are called knowledge reservoirs. These reservoirs have been defined in many different ways. McGrath & Argote (2001, 611) argued that there are three different basic elements that can be combined into different subnetworks depending on what kind of knowledge is the subject. Walsh & Ungson (1991, 62-70) explained it from a different point-of-view that had more to do with how the organisations past memory and knowledge affected the psychological side.

According to McGrath & Argote (2001, 611-612) there are three basic elements in an organisation in which the knowledge is stored. These are members, tools, and tasks. All these three basic elements can be put together

in different forms when they come together as a different form of knowledge, called subnetworks. The basic elements can be combined into seven different subnetworks. The members are the human individuals in the organisation. Tools are the things individuals use to do their jobs. This category includes both hardware and software components which can be used also on the technological side. Tasks are what the organisation itself wants to achieve, what it wants to do and what the purposes are. Four of the subnetworks that were mentioned by McGrath & Argote (2001, 611-612) can be formed to include the member element:

1. The member-member network is comprised of the social network the individuals in the organisation have made and the organisation has.

2. Member-task network describes the network, which is comprised of which people are assigned and suited for which tasks.

3. A member-tool network explains which individuals are using or able to use which tools in the organisation.

4. Simply put, the member- task-tool network explains who does what with what.

The remaining three subnetworks that were mentioned by McGrath & Argote (2001, 611-612) can be formed as such:

1. Task-task network is used to describe what kind of combination of tasks and routines the organisation uses.

2. Tool-tool network on the other hand explains what kind of different tools, programmes etc. the company uses for its work.

3. The task-tool network describes then which tasks are done with which tools.

In a Higher Education Institution the members can be students, lecturers, researchers or staff the HEI employs. The tools are the hardware and software these members use to communicate with each other and with the businesses they are cooperating with. These tools are also used to implement changes and knowledge transfer between the HEIs, businesses and departments. The tasks then describe what the HEIs want to do with the business. These subnetworks in the context of this thesis can mean either the networks created in the HEI between people and departments or the networks created between the people in the HEI and the businesses they are cooperating with.

3   TRANSFERRING KNOWLEDGE IN/BETWEEN ORGANISATIONS

It is argued that the knowledge transfer within a company, as well as externally, is improved when the subnetworks are more compatible with the other subnetworks they are involved with. As an example of this can be used when the people who are best at certain tasks are assigned to use the tools which work with the tasks they are best at. This increases the tacit knowledge of an organisation e.g. when certain people operate on the machines they know the best and can also show others the most effective ways of using them. Tacit knowledge is knowledge that an individual has without knowing it. This can manifest itself e.g. in the way that a worker does things more efficiently than other workers, because he knows of a way to do it better, without realising it himself. Besides moving knowledge from one reservoir or network to another, knowledge can also be moved modifying the reservoir or network. Most often this means either training or communication with the subjected unit. (Walsh & Ungson 1991, 63, 65; Argote & Ingram 2000, 151, 157, 160.)

There are two different ways that knowledge transfer from the reservoirs happens between units in an organisation or between organisations. The first one is where the other unit informs the other of a new way of doing things or it is moved to the other unit totally or partially. The other way is when the recipient unit doesn't know it has actually gained knowledge. This can be e.g. through programming, when the unit operates machinery and it has been modified by someone else making it more efficient. In this case the recipient unit wouldn't be able to explain the raise in efficiency. As noted earlier one of the things that make acquiring knowledge between units and organisations easier or more likely is that they are similar or compatible to each other. Moving one unit which works well in one location doesn't mean that it will work well together with the other unit even when the tasks might be similar. This is because there are always even more acting forces than only the basic elements of members, tools and tasks. This is because as all three basic elements must be compatible with each others, the new unit has to be

compatible with the new environment it is in as well. (Argote & Ingram 2000, 156-157.)

It has been argued that moving members is a very good way of implementing knowledge transfer within the organisation. This is because when members are moved around they can apply their previous knowledge so that it is applicable also in the new environment. In this way the businesses may also create "floating factories", where workers and all other required machinery etc. need to be moved. (Galbraith 1990, 57-58.) Another good reason for this is that people are able to move tacit knowledge with them as well also, when others can learn by observing, as well as knowledge which they are able to explain to others. Even if the people move with the technology they always need to learn some new things, but the time for it needed is much less than with people who start with no previous experience. (Galbraith 1990, 60-61.)

There is an empirical study made by Gruenfeld, Martorena and Fan (2000, 45) in which they found out that moving individuals from one group to another didn't bring in the same ideas directly from the person's previous group. The study actually found that the new ideas that were presented in the group were not having much impact, but the group preferred to continue relying on the ideas from its original members. It was actually found that when the member returned to his old group, it was much more beneficial for innovation, as the new members had more individual ideas than before compared to the rest of the group.

When talking about knowledge transfer in the technological form, tools in the basic elements, Zander & Kogut (2008, 70-71) found out that it is easier to adapt for it when it is transferred within the technology. This is when the members don't necessarily realize the change themselves. Zander & Kogut (2008, 68-69) also noted that for people it is much easier to learn simple procedures than simple facts, which also leads to thinking that when knowledge is transferred in the technology it is learned easier. In a separate

study it was found that when technology is moved in the organisation, the knowledge transfer is more successful when members are moved with it. In the same study it was also found that the transfers are usually more difficult than the organisations had expected them to be showing they hadn't anticipated all the problems that could arise. (Galbraith 1990, 68-69.)

Even though studies show that the knowledge transfer is much easier when it is within the technology, it also has its disadvantages. According to Mansfield (1985, 217) the knowledge leaks out from the company much easier when it is in the technology. He had observed that new products or processes in the company leak out to its competitors within 12 months of their invention and implementation, whereas the decision making procedures took something between 12 and 18 months. That's why it would be more advisable if the knowledge could be in the member related subnetworks. This would prevent, or at least discourage, external knowledge leaks.

Gaining competitive advantage through knowledge transfer is not easy and the best way of getting value for money in this case is when the organisation develops the innovation itself. This is because the value of the innovation to the organisation should also be reflected in its price to the organisation. Gaining competitive advantages in highly competitive markets is hard, which also makes it that much harder to find these innovations outside the organisation. (Barney 1986, 1232.) This is also further shown by the fact that to make it a true competitive advantage the innovation must be hard for the competitors to copy as well. Another thing that makes some innovations worth more than others is the fact that on some markets the possible competitors aren't even aware of the fact that they could enter the market. (Barney 1986, 1237-1238.) These are of course issues, which can be addressed by patents since patenting an invention protects the company's innovations (Argote & Ingram 2000, 155-156). Another thing that needs to be considered in this is also the collaborative research companies can conduct themselves in, in order to gain innovations not only internally, but also externally. Both of these issues will be dealt with in more detail later.

3.1 Benefits of networks and creating them

HM Treasury (2003, 31) concluded from its investigation with the businesses and universities in the UK that the best way to transfer knowledge is to include human interaction in the process. They concluded that the reason for this is that many of the projects and cooperation start because of people from each side meeting and agreeing. For this reason it is also true that forums in which the academics and businesses come together increase the chances for such collaboration. Another way of helping this matter would be that more business people would attend the university activities. This has been rationalised so that as the academics use time on the boards of various businesses and make contacts there, it could be beneficial for the businesses to create contacts within the universities and get a better feel for them via working in the university life as well. A study made by the Finnish education ministry (2007, 46) concluded that the same kind of cooperation is very beneficial for the Universities of Applied Sciences (UAS). The study concluded that the tight cooperation benefits both sides as recruiting outsiders to the board of a UAS increases its commitment to the working- and business life outside the school borders as well when a person with actual ties to the business life sits on the board giving his opinion. The study (2007, 53) showed that networking between UAS and businesses is a very important key to success, but unlike with universities, the UAS needs to put more stress on creating strong local networks than nationwide. This notion has been further stressed by Isokangas (2007, 46) who thinks that by focusing on local networks UAS are able to create new jobs with businesses. The reason why UAS need to focus more on local than nationwide needs, is that needs of local businesses are often very specific and different than those of bigger companies, which makes UAS ideal partners for them (OPM 2007, 57).

It was stated in the HM Treasury (2003, 32) that building up alumni networks is very beneficial for the universities in gaining contacts in the business world. As an example they have used the alumni networks which in the US are built and used very efficiently. The old graduates from the university provide good

access points for the first meetings between universities and companies. Even though their recommendation is made for the UK universities, there is no reason it couldn't be applied to other countries and institutions as well.

One of the ways in which businesses and HEIs can work together is to have students working in the company already while they are studying. We could call these sponsored students. This happens when the company takes a student or students on its payroll working with the company's staff. In this way the company gets people who are about to graduate onboard and can see which are the best and then often recruit them on their payroll as full-time employees. They also gain access to the HEI's knowledge via the students. This kind of cooperation is common e.g. in the way that the school offers its students possibilities from the companies from which they can get part-time jobs.

3.2 Ways of cooperating and transferring knowledge

The study by the Finnish ministry of education (2007, 46) has found several ways in which UAS cooperate with businesses and help the local development. One of the most important ones for this are the theses that are made by the students at UAS. Theses are made with the idea that they are beneficial for a business or organisation by e.g. helping them develop certain areas of their operations. Another thing that benefits the businesses is that UAS have a requirement of practical experience from work that is related to the students' field of studies. As I mentioned earlier, including people from business life as UAS board members is very beneficial for both sides. Having members in the board is not the only way of including members of the business community, but getting them also involved with the strategic planning and other activities of UAS gets them more involved with the UAS thus getting them more familiar with what there is to offer. In this way UAS can also get first hand information on what direction it should develop its teaching and

projects, as it has better information on what the local businesses want and need.

Three main methods of transferring knowledge from university to businesses were identified in the HM Treasury (2003, 34). These methods were contract research, collaborative research and consultancy. All methods are very useful and are suited best for different kind of situations. Of these methods Contract research and consulting are ways of cooperating with businesses that UAS use often as well.

3.2.1 Contract research

Contract research happens when the company hires the researchers of the university to make a specific research for its purposes. The company itself is not usually working on the research itself, but it receives the information gathered by the researchers (HM Treasury, 34). For the research itself the university can also use e.g. the students which then gain knowledge and experience in research, if the contract allows it and the research is collecting data e.g. by interviewing people. This method has been used at least in Kymenlaakso University of Applied Sciences. The HM Treasury (2003) also concludes that contract research is most often used to find out certain pieces of information about the markets which are close to some of their products or to run product testing.

For the HEI, conducting contract research gives them a good way of gaining their first contact point in the business. This, in-turn, can lead to long-term cooperation with the business itself. In this way the idea is the same as in sales, serve your customer well the first time and it is more likely that they come back (Ojanen, 2009). It can also serve as training for the HEI's researchers or students, when they have to be knowledgeable about all the recent trends in research. This is also a way of getting more revenue to the

university. For the businesses the benefits are mostly financial, since making contract research with a university saves the company time, resources and money. (HM Treasury 2003, 36-38). The projects UAS have with businesses are often fairly small and too narrow. Having large projects, which are very broad in their scope, should be a target for both, as they can develop into long-term partnerships and the results are more fertile. (OPM 2007, 47.)

The HM Treasury (2003, 37) thinks that the biggest problem that can arise from outsourcing the research to an external organisation for the business is that the result of the research might not be what they wanted. When this happens in a research conducted by the business itself they are able to just suppress the information. When the research is conducted by a HEI a conflict of interest might arise then if the results are not favourable for the business, for the HEIs are publicly funded institutions in many countries and should be viewed as an impartial institution in other countries as well.

3.2.2 Collaborative research

Collaborative research happens when the researchers of both, university and business, work on the issue together. Collaborative research is used when the research of the topic needs to go deeper than when contract research is used. At this time the research can benefit from the expertise and knowledge from both, scientists and engineers from the business's side and academics and researchers from the university's side. In collaborative research the money flows from both, business and university. Although in some cases some public sector institution can account as the money flow from the university's side. In a way you could simplify that the roles in this relationship is that the business offers the research data they have collected already earlier along with staff and the technology or equipment that is needed to make it happen. The university on the other hand provides the knowledgeable researchers and accomplished academics along with an international network to work with. (HM Treasury 2003, 34, 38.)

One of the problems with collaborative research is the intellectual property rights which might arise from the cooperation. It is sometimes hard to say clearly which of the sides involved owns the intellectual property rights of the result. This is also why it should be made clear at the point when the agreement is made who owns the rights for the intellectual property. Regardless of this, the HM Treasury (2003, 37-38, 40) concluded that they think this is one of the most effective ways of transferring knowledge between universities and businesses. This is due to the fact that when both sides are working on common issues and they share the information which is beneficial on each side breakthroughs in research are made more easily.

3.2.3 Consultancy

Consultancy can be considered as either someone giving advice on a certain field where they are considered as experts or when they are asked to give their analysis on a certain issue (HM Treasury 2003, 34). As an example of consultancy could be when sales companies arrange sales consults to give out pointers and advice to their sales people to help them gain knowledge and new insights for their sales situation.

The HM Treasury (2003, 35-36) also states consultancy as an attractive option for both sides because it is a very simple way of coming together and getting a feel of the partner. This also works both ways, since businesses and universities both use expert consultants for their benefit. As an example for universities, hiring consultants from businesses always gives them a contact point within the business itself. This in turn can be turned into possible research agreements etc. Consulting also links the academics and businesses better together since the more contacts they have with each other, the closer relations they can have which also enables better technology transfer in turn.

3.3   Promoting and collaborating

As I've stated earlier here under heading 3.1, building up strong alumni networks improves the possibilities for knowledge transfer between businesses and HEIs. This also works in the way that when cooperation with e.g. sponsored students works out, the business gets qualified workers, but this also ensures that the business already has links inside the business for further cooperation when there are possibilities for it.

As the promotion for the universities has become more and more reliant on existing relations and links, the relations themselves have become more and more complicated. For the university to be able to handle all the different aspects of upholding these relations, many have created a front office to handle them. The other for the existence of these offices is that the sheer number of relations they have has become so big, that they need designated people for handling them (HM Treasury 2003, 42.) E.g. Masaryk University has seven people working in their Technology transfer office, each of them having a designated task to handle. They also have 3 external employees to help them on different issues that might arise during their projects. Although this is a recommendation made for universities, it should be applied in all HEIs.

The HM Treasury (2003, 42-43) has listed several reasons for the existence for these liaison offices. For HEIs the advantage points include having dedicated people working on creating the networks with the businesses, having qualified people marketing the services the HEI is able to provide straight to the businesses and having competent people giving advice on making the consultancy and research contracts. Especially with collaborative research contracts there are many different and complicated points, which need to be addressed, most importantly the negotiations for the intellectual property rights. The businesses in turn often view HEIs as institutions where the entry points are not too clear and people who need to be contacted are not

too obvious. For these purposes having an office, which is dedicated for handling business relations, makes the HEI more approachable for the companies.

3.4   Relevance of outside funding

HEIs can also get funding for its operations from other sources. Usually this funding comes from different organisations which are established for improving making innovations or research in certain countries. It could also be the government itself funding them (HM Treasury 2003, 43.) In the UK these organisations could be e.g. the Higher Education Active Community Fund or the HEIF. The Higher Education Innovation Fund itself is funded by Her Majesty's Treasury. In Finland Tekes could be used as an example of such financing.

There are several ways that third party funding can help the university. The HM Treasury (2003, 43-45) has made suggestions on what kind of impact it could make in the United Kingdom but there is no reason why these findings would not be applicable for other HEIs elsewhere as well.

Outside funding helps the HEIs to engage themselves more actively with e.g. the Small and Medium-sized Enterprises in its region. There is also a good reason to do this, since SMEs more often don't have the resources to do research alone. The HEI can offer them an affordable choice to conduct e.g. market research when the business' own resources are limited. As the HEIs often have an abundance of intellectual capital, they also need to be able to offer it to businesses to make it worth its value. As mentioned already earlier, having an office to take care of the HEI's business relations is highly beneficial to them, and this is one of the things to which HEIs can also use the third party funding for, if they can't find the money elsewhere. Spinout companies are something the HEIs can also make in order to capitalise on their

knowledge and intellectual capital. Another benefit from spinout companies could be that the HEI itself could provide its students work placements in the industry to collect invaluable work experience.

The OECD follows how the research money used is divided among SMEs in different countries. If we use the EUs definition for SMEs, then we can see from Figure 1 that the big companies use most money for research, besides some exceptions. On average the SME companies get about 20% of the research money that is used on research & development by the governments of different countries in the OECD countries (HM Treasury, 26.)
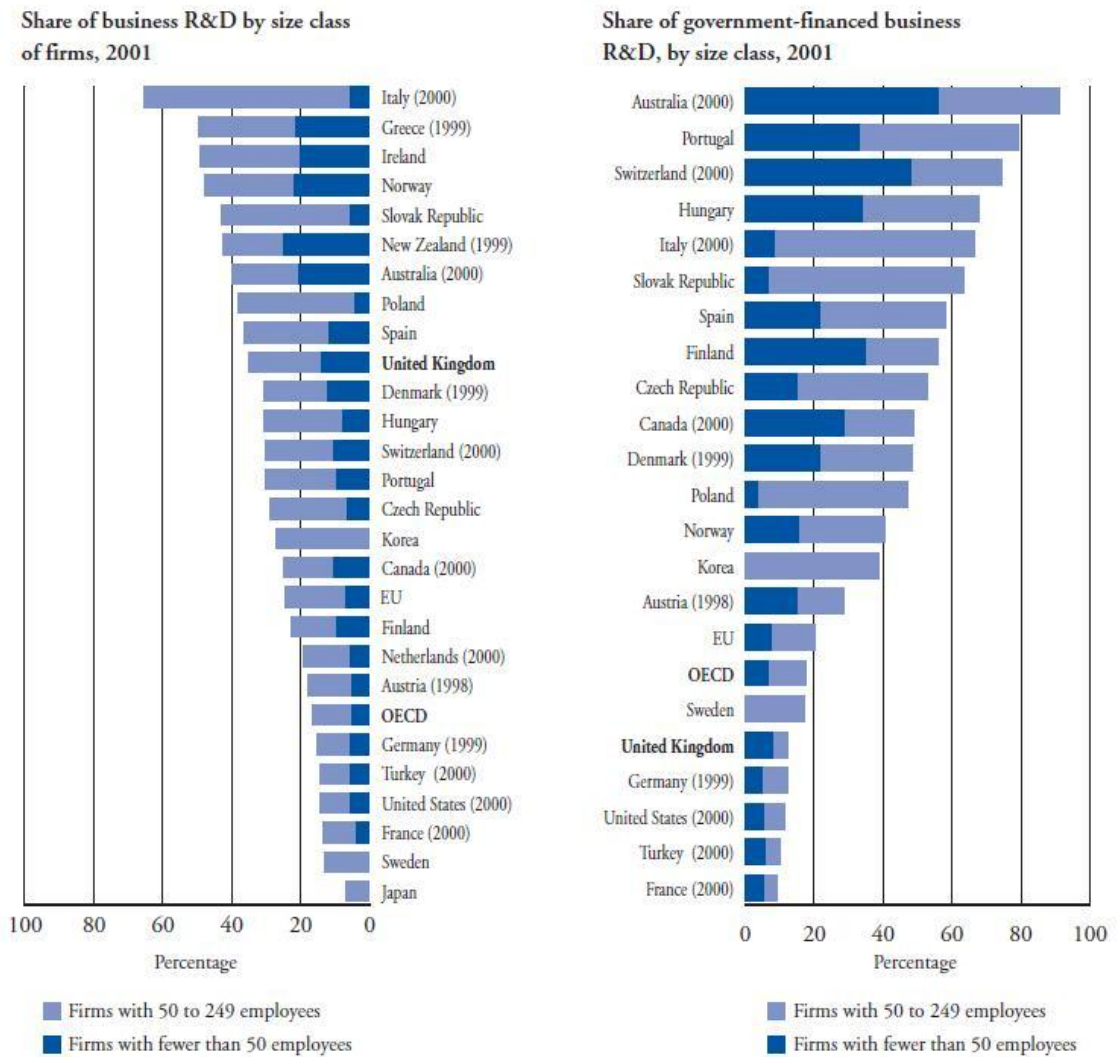

Figure 1: R & D spending in OECD countries (OECD Science, Technology and Industry Scoreboard, 2003)

3.5 Benefits of collaboration for businesses

The HM Treasury (2003, 23-24) has found out many different ways of how the businesses benefit from cooperation with universities. It also notices that the university does not need to be one of the world leaders to make the cooperation worthwhile, but those universities who don't have as many resources to conduct research can also be of much use. This is also one of the reasons why profiling their competence is so important for UAS, because realising the needs of the local business community and focusing their resources on these aspects results in greater results (OPM 2007, 46).

Through HEIs the businesses can gain access into a wide pool of information. This is due to the fact that the researchers and academics in HEIs are often very international and up to date on all the new information and technology that encompasses their field. This on the other hand lets the businesses utilise these new findings faster and more efficiently. It is a simple fact that HEIs have a much larger network of knowledgeable people to run research than businesses in general. (HM Treasury 2003, 23-24.) As a good example one could use Procter & Gamble, who according to themselves have thousands of researchers working on research and innovation work, but outside the company itself there is 1.5 million researchers working for them.

For the businesses one of the points is also the third party funding which HEIs have access to. When the research is made in collaboration with the HEI, the business gets more value for its money when it doesn't have to be liable for all the costs, which occur in the research. (HM Treasury 2003, 24, 34, 38.) Of course in these cases the businesses need to make sure that any intellectual property that comes from the research is available for their use. Either by owning the intellectual property rights or by getting them for their use by some other means.

One very important reason for the cooperation could be finding out the best students for hire. As I mentioned earlier the "sponsored student" option under heading 3.1 as a possibility for this earlier, it should also be noted that the business doesn't have to sponsor a student to find the best available options, but often they can see the potential already when they are working on some project for the business. (HM Treasury 2003, 32). As the actual employment of students is one of the key criteria for UAS, at least in Finland and in Germany, they should monitor closely how their graduates are being employed in the field they have studied, locally and nationwide. (OPM 2007, 50; Schultze 2009) If the employment rate is not high enough, UAS should look for answers from businesses and its graduates to find out what could be the reasons they haven't become employed in their field of study.

A study made by Community Innovation Survey (2001 cited in HM Treasury 2003, 24) has made a study on the relationship between business' performance which are cooperating with universities and which weren't. The results are very clear. As an overall look you can see from Table 1 that businesses, which have used the option of cooperating with universities, have been doing much better in most relations to the companies that haven't. Though the data is very conclusive, it can be said that cooperating with a university is not a sure way to gain success.

Table 1: CIS survey on the effects of university-business partnerships (HM Treasury 2003, 24)

	Increased range of goods and services	Opened new market or increased market share	Improved quality of goods and services	Reduced unit and labour costs
Enterprises which do not use universities as a partner	42%	40%	46%	33%
Enterprises which use universities as partners	82%	81%	85%	65%

3.6 Intellectual Property

3.6.1 Definition

According to the World Intellectual Property Organisation (n.d.a, 5), "*Intellectual property refers to creations of the mind*". The important reason for including intellectual property rights into this conversation is because a lot of the knowledge transfer which happens also deals with the issues regarding intellectual property rights. The most common forms of intellectual property rights used in knowledge transfer according to the HM Treasury (2003, 47) are *"patents, copyright, designs and trademarks"*.

The WIPO (n.d.a, 5-6) expresses that intellectual property itself relates to certain pieces of knowledge or information that has been created by the human mind. Since intellectual property refers to something that has come up from the creativity of the human mind, it doesn't require it to be physically tangible, but refers to the presence of certain knowledge which can be used to materialise the said innovation, invention etc.

Intellectual property rights are protected in each country separately, and the rules for them may vary depending in which country you're situated in, but the WIPO has made the playground more homogenous, and has made many international treaties to improve them. Although the laws might vary from country to country, there are mainly two reasons why intellectual property laws have been made. The first one is to give the innovative people who make the discoveries the moral and economic rights to their products. The second reason is highly related to the first one. By rewarding innovation, it encourages people and organisations to develop new applications, creations etc. to improve economical and social environments. (WIPO n.d.a, 6.)

Intellectual property can roughly be separated into two different categories: Industrial property and Copyright (WIPO n.d.a, 6). According to the HM Treasury (2003, 47), there are four types of intellectual property which are most common. These are patents, copyright, designs and trademarks. We will now take a closer look into the differences which separate these two different classes of intellectual property.

3.6.2 Copyright

Copyright in itself doesn't protect the author from other people using his ideas and thoughts. The only thing it does protect the author, is in the way that the author has expressed his ideas. Other people can also express his thoughts in other words, but by using the same wording as the author the person would be committing a plagiarism. (WIPO n.d.a, 7.)

For the financial capitalisation of their work, copyright owners have two different options. If the author assigns the rights or a right to someone else, then the recipient may use the rights according to his own will. If all rights to the product are transferred to the recipient, he becomes the new owner of the copyright. It should be noted though that transferring copyright ownership is

not legal in all countries. Licensing is the other way of capitalising on copyright products. In licensing the author gives a third party the right to do certain actions with the product in an effort to gain financial benefits. If a person licenses his product, it doesn't mean that he can't do anything else with it. E.g. a writer can give a licence for using his product for publishing a book, making a film, a videogame etc. In some cases it might be more beneficial for the author to give someone exclusive rights for his creation. In this case the author concedes his right to licence the product to anyone else. (WIPO n.d.a, 15-16.)

As the copyright mostly covers only the way ideas are expressed, its meaning for the purpose of this research is limited to the point that it also covers computer programmes. Computer programmes are protected in the international community by the WIPO Copyright Treaty 1996. The reason why computer programmes are protected by copyright and not patents is because it needs specific wording in the programming itself to be able to execute the functions that are wanted. (WIPO n.d.a, 8-9.)

Copyright is always established whenever the creation has been shown in a tangible way. The copyright doesn't last forever, but it varies between the legislation in the country. The most common duration is when it expires minimum 50 years after the death of the author. (WIPO n.d.a, 14.)

3.6.3 Industrial property

Industrial property has many different ways it presents itself. Of the four most common intellectual property categories I mentioned earlier, three are counted as industrial property; inventions, industrial designs and trademarks (WIPO n.d.a, 6.)

Unlike copyright, applying for and getting a patent for an invention is very different. An invention is something that is totally new. Although there is no one way of defining what clearly is an invention, the most common one presented is that it is a new solution for an existing problem. Since the patent itself covers the idea itself, the solution doesn't need to be tangible per se. Having a patent on an invention gives the person or entity complete monopoly on the invention. This means that all kinds of re-production of this idea, while the owner has the patent, are forbidden without the approval of the person who owns the rights to it. Since the patent itself gives the person or entity complete monopoly on the invention, the ownership time is drastically less than in copyright. There is no universal time limit, but the most common one is 20 years. This is long enough of an incentive to people and organisations to encourage them to make innovations and progress. A condition for the patent is that the inventor gives the information on his findings to the public, so that others may develop his invention even further. This helps new innovations to be made, and is an essential part of the patent application process. (WIPO n.d.a, 6-7; WIPO n.d.b, 5-6.)

The World Intellectual Property Organisation has disclosed four requirements for an innovation to be able to be patented. The requirements are called conditions of patentability.

1. *Industrial Applicability* – This basically means that the invention needs to be made or used in some kind of industry. The limits for the industry have not been clearly set but vary.

2. *Novelty* – The claimed innovation needs to be something that is new to the field in which it will supposedly be used.

3. *Inventive step (non-obviousness)* – The invention itself needs to be innovative enough, meaning that an average Joe wouldn't be able to come up with the solution to the problem.

4. *Patentable subject matter* – The invention itself has to be accepted by the law in the country in which it is applied for, for some subjects do not fall in this scope in all countries.

Requirements number two and three mentioned above need to be met when the application for the patent is filed (WIPO n.d.b, 6)

Industrial design is something that separates the product from the other products in a visual way. It doesn't only mean that the product has to be different in shape, as long as it has some distinguishable visual difference to other products. Since it is called industrial design, the intention is also that the product's visual difference can be industrially produced, and doesn't need to be hand-crafted. Main reason for industrial design as being a patent is that it helps the product to distinguish itself from other similar products on the market. For the design to be considered for a patent, the design needs to be either brand new or completely original. If there is no significant difference to some other design on the market it will not be accepted. So as it can be understood from this, the patent does not protect the product itself, merely the way it is represented. (WIPO n.d.b, 9-10).

The WIPO classifies a trademark as "*a sign, or a combination of signs, which distinguishes the goods or services of one enterprise from those of another*". Usually a trademark consists of some visual images put together, certain words, shapes etc. A good example is the Coca-Cola trademark, which includes the name, shape and colour. Though in some countries also sounds, tangible objects and even smells can be registered as trademarks, in most countries only visual or graphical signs are accepted. (WIPO n.d.b, 12.)

4 DIFFERENCES BETWEEN STUDIED COUNTRIES

I have chosen Germany, Czech Republic and Ireland as my comparison countries. Germany is an easy choice, being the biggest economy in the European Union. It is interesting to see how a Higher Education Institution cooperates with the companies in the country and its region. Czech Republic is an interesting choice in itself, since it is probably the most developed country of the ex-soviet countries that has joined the European Union. To see how one of the largest universities in the country cooperates with the businesses could be very helpful in also finding out aspects to improve in other HEIs. Ireland was a clear choice from the start. I personally view Ireland as a very innovative country, and it is known for its competitive edge due to its low corporate tax. For this section of my thesis I have had a personal interview with Project Manager Dr. Eva Janouškovcová from Masaryk University, telephone interviews with lecturer Prof. Jörg Hammermeister and Research Associate Prof. Stefanie Schultze of Fachhochschule Oldenburg/Ostfriesland/ Wilhelmshaven and emails with Incubation Centre Manager Sean MacEntee, Head of Development Gerry Carroll and Head of the Teaching and Learning Centre Ann Cleary of Dundalk Institute of Technology as well as with Project Manager Dr. Jan Pavlovič of Masaryk University. Other materials from these countries that I've studied include the Knowledge Transfer and Innovation Strategy 2009-2014 which Dundalk Institute of Technology has published. From Masaryk University I have used include the self-assessment and provided services process analysis at Technology Transfer Office, newsletter published by the Technology Transfer office and description leaflets from different departments.

4.1 Personnel

All three HEIs have their own office for handling the relations with the businesses they're involved with and to create new ones. The Masaryk University and Dundalk Institute of Technology, from now on Muni and DkIT,

each have employed five people to taking care of the relations between their university and businesses, these five people handle not only relations but also projects etc. The Oldenburg/Ostfriesland/Wilhelmshaven, from now on referred to as FH-OOW, has two people taking care of the relations with the various companies they are cooperating with and one person to handle the public relations of the UAS.

Muni has eight people in total working on different aspects in their research centre, but they also have three externals working, giving advice on different legal, contractual and project issues that might arise during the process. DkIT has a plethora of workers on several different research projects they have going on. As stated above they have 5 people working on the contacts, but DkIT has a strategy in which they state that their aim is to rise to become an internationally recognised research institute. Due to this fact they have many different big research projects going on. These project groups contain lecturers, professors, researchers as well as graduate students of the school itself. At FH-OOW the research efforts are different from DkIT. They don't have specially assigned people for cooperating with businesses besides the contact persons in their centre. As it stands, the university itself doesn't have any research efforts with the companies but they have three different institutes, which are operated by the professors and students of the university.

FH-OOW doesn't have that active conversation relation with the companies it has cooperation with. This is partly because although they do have some research and improvement cooperation going on with some businesses, mostly on a consulting base, the need to have close conversation relations is not needed. The relations are kept up, but the conversation connection is usually closest when the time closes when the company comes to visit the lectures of the professors and lecturers. For Muni and DkIT the frequency of communication varies depending on the schedule of the work, what kind of cooperation is in question and at which stage it is at. In both cases the variation between the contacts depends on what it is related to. It can be from daily to weekly or even monthly in the frequency of conversation activity.

4.2 Areas of cooperation

All of these HEIs are mostly focused on few different key areas in which they have special knowledge and competence. Instead of research activities as the main point for cooperation, FH-OOW has concentrated its efforts in helping its graduates being employed in their field. FH-OOW doesn't actually engage itself in any activities with its partners that include financial capital gains. FH-OOW helps it students in a number of ways in its efforts to give them opportunities to get employed. They offer business days where the businesses come and present themselves to the students. The business days are a good way to get to know the businesses that are most interested to hire students as the students are allowed to ask questions about the companies' policies etc. Schultze (2009) also explained of another way how they are helping the students to become employed. The university has an agreement with some of its long-term partners which gives the students of the university the opportunity to apply for a job in the company before the company looks for workers via employment office, newspaper ads etc. The reason for this is that the long-term partners know what they get when they hire a student from FH-OOW, as they know the level of teaching and what is taught in the school. This kind of cooperation benefits graduating students a lot by giving them certain priority over other applicants if they have the other required qualifications.

The FH-OOW also cooperates with businesses in such a way that they are brought forward in lectures. This means that most of the cooperation happens via the made connections between certain lecturers and the businesses and the businesses come present themselves in classrooms. Usually at this point the business representative will come to the lecture and start with giving information about the company before taking them to the company grounds to see how they work and things are done. If the company which comes is a big one, the representative is a full-time presenter, meaning he goes from HEI to HEI to give the same kind of introduction about the company. The reason for companies to do this is because in Germany the companies are "at war" for

the services of the best students. Professor Hammermeister (2009) stated that the companies want to recruit the best people straight from the UAS in order to obtain their services before they go to their competitors. The way in which the UAS has been able to include this activity in its programme has been by including a certain amount of hours that the lecturers and professors can use for being in contact with the businesses. Most of the conversation usually occurs before the company comes to visit that semester when all the arrangements are agreed upon.

At Muni the concentration is on doing market research, making IT innovations and researching life sciences. The market research can be conducted in various ways always depending on what kind of market research it is. Sometimes it can be conducted also by the students as a way of getting credits for a course, but it also gives the valuable experience for making e.g. customer surveys. The information technology innovations that the university makes are made as collaboration contracts with the businesses they are developed with. As I stated earlier in this study, the universities need to take into consideration both needs when making collaboration contracts with businesses. Muni has especially made efforts in joining the companies in their effort to commercialise their innovations and making them practically applicable. Muni has Irena Třísková working as the person who is basically responsible in working out the details with the companies for the collaboration contracts. The third major research and cooperation field for Muni is life science. The life science research group makes research on various biological issues and the Muni's transfer centre makes use for it in the business community in several different ways. One of the most important objectives for the research centre though, is to gain intellectual property rights, i.e. intellectual capital for the university to use in order to gain financial capital and acknowledgements among the researcher and scientist communities.

As stated under heading 4.1, the goal for DkIT is to become internationally known for its research. As this is the case, they have various different key areas, but for the business side the most important one is innovation

management. In innovation management they are using both push- and pull-methods. Push-method means that they will try to find ways of capitalising on existing or new technologies they or the business they're cooperating with has invented. Pull-method means that the customer has a need that needs to be filled and the efforts are made to find a solution for this problem. As with Muni, DkIT's most important goal for its research is to gain intellectual capital from the collaboration projects with the businesses of the region. This can also be seen in their knowledge transfer and innovation strategy for years 2009-2014, in which they state that they should average €10 million per annum from research and knowledge transfer payments during the strategic period. Into a lesser extend DkIT makes market research and other business supporting activities for which they have capabilities. Next to their business side of things they mostly concentrate on technology transfer, since their science and technology department is well known in the region.

4.3 Cooperation between lecturers and companies

The lecturers of DkIT work on certain projects together with the researchers of the businesses or DkIT. Since this is not a part of their main purpose at the university, they have made up a voucher mechanism, which enables the lecturers to contribute to certain projects up to 70h of work. These vouchers will then be covered separately. Another kind of cooperation the lecturers provide from the university's part is consultation and advice. Some of the lecturers will either give consultancy or advice to the company on certain issues, and this also works vice-versa in so that the company also provides the university with lectures from the company's workers to give corporate inside to the students and lecturers of the university. At Muni the cooperation between lecturers and businesses is mostly restricted to consulting efforts. On some instances they may also give assistance to the researchers on some projects, but mostly their efforts when it comes to businesses is consulting.

FH-OOW has a different approach to this compared to the other two universities we have as comparison here. As mentioned earlier the lecturers are mostly responsible for keeping tabs with the businesses they want to incorporate in their work. Most of the cooperation between the professors and businesses happen through the institutes FH-OOW professors and lecturers have put up with their students. The institutes do different kind of projects with the businesses, e.g. help them make new marketing campaigns and market research. Schultze (2009) added that there are basically three different institutes. These institutes work on three different specified aspects: touristic marketing, cooperation with energy companies and consultation for entrepreneurs.

4.4 Needs of businesses

All of the people I interviewed for this study agreed that the initial contact could be made by either, the HEI or the business, but that most of the time it is the business, which makes the initial contact. The reason for making contact with the business then depends on which side makes the initial contact. There are also differences between the universities on what they are looking for from the cooperation.

DkIT gets inquiries for improving the business' process development when talking about improving existing solutions. Another thing that businesses turn to DkIT is when they are looking for help on researching a new product or solution for existing problems. These kinds of collaborative research agreement offers are the most common ones when the businesses make their first contact with the university. Sometimes the businesses are also looking for some technical and research assistance on their own innovations or fixing certain technical issues they have met when implementing them. DkIT also takes a more interactive approach to the cooperation, as they do also offer their services themselves. The biggest reason for them offering their services is to offer their expertise in research and to offer their own innovations to

companies. This is to increase their revenue and to make most of their intellectual capital. As an extra benefit they get from this is to establish more connections in the business world, thus creating more possibilities for cooperation. Another reason for this is to offer the students of the schools placements in the companies they are working with. This is a possibility for all: businesses, the university and students. The businesses get a chance to recruit promising young graduates, or soon-to-be graduates, students get possibilities in improving themselves and getting a job and the university gains recognition for its efforts and also gain more connections in businesses by having their former students working their.

For Muni the variation in the needs of the businesses is bigger than for DkIT. The needs of businesses vary from human public relations management to biological case studies. The business side of their research side mostly gets requests to do product development or help the company in managing their human resources. The product development efforts can be either improving a currently existing product or to create a new product to fill a demand. In these cases Muni usually makes collaborative research agreements with the companies, which is also what they are usually looking for themselves, on top of offering their own existing innovations to companies, which might have use for them as it is.

4.5   Benefits of cooperation

Regardless of what kind of company or project is going on, there are usually benefits, which are always clear and usually happen regardless what the partners are working on. All the interviewees basically agreed on a few benefits that are achieved through the cooperation, the most common one being that when academics take part in the projects they gain valuable experience also from the business world, which often opens their horizons as well. This in-turn helps them to make their lectures better. Another point that is important, at least for Muni and DkIT, is that a part of the purpose of their

research departments is to help the region and area to grow through help and innovation. DkIT in-fact is obliged by Irish legislation to "support the economic, social and cultural development of their region" according to Gerry Carroll (2009.) Ann Cleary (2009) also included that the cooperation usually gives their university a better insight into how the business usually operates and what kind of needs they have, which helps them in the future to work together with the business and fill their needs better. The universal benefits for companies were quite simply stated in all interviews and answers I got. Of course the most obvious benefit for the company is that more often than not, they get some kind of solution for their problem in one way or another.

I also asked about the kind of benefits that sometimes arise from the cooperation, even if it was not one of the aims of the project. The most common one iterated by most interviewees was that a successful project could change to a long lasting collaboration between the HEI and business. This of course would be in the best interest of both sides in general. Others that were mentioned included the possible employment of the graduate students from the HEI and the increase in the HEIs reputation, which then of course helps in the recruitment of new good students and getting new projects to work with other businesses. Besides the prospect of getting their own graduates to be employed by the businesses, it can also enable the university to get some student projects which gives the research students valuable experience in commercialising findings of their own, on top of the possibility to get experience in working with real-life projects for companies which can be very useful in the future.

4.6   Difficulties

Different kind of problems arise often when the HEIs and businesses work together on solving problems, but they also often have very different point-of-views to what they are actually solving and how they should be solved not to mention how the solution then should be used. Problems are not as simple as

they also surface from each side. I asked the people to think about the issues from each side to get a better view as to what kind of issues have come up.

A common problem seemed to be that the academics from the HEIs that are working on the projects might not be interested in the business side of problems, which then is problematic for the businesses since the reason for them is to find commercial use for the solutions they come up with the HEIs. This is because the academics usually prefer to come up with theoretical solution models for the issues, which doesn't help the businesses. Another problem that came up in my research was that the businesses thought the HEIs were not fast enough in working on the issues they had. Gerry Carroll (2009) for instance gave examples of businesses that had contacted DkIT with a problem for which they needed a quick fix, but the slower pace in which the university works with was a problem for the businesses that needed immediate help with their problem.

For the HEIs the different kind of interest of the businesses may prove to be a problem at times as well. At times it has come up that also the personnel of the company is hard to motivate to work for the project, since they feel as the researchers and lecturers that sometimes move to work with or to the company might overtake their jobs. It also sometimes happens that the workers simply don't feel like they would be obliged to assist the HEI's personnel on the project, which slows the progress down. One problem that came up with Jan Pavlovič (2009) was that, as the company's owners always have to think about the best of the business, so do the university's stakeholders who sometimes might have different interests than the businesses.

The problem with the Intellectual Property rights is the most common issue with Muni and DkIT. Both of the universities agreed that the issue with the distribution of IP rights is usually the hardest one. Both parties have their own interest in how to use the intellectual rights and they often do conflict. DkIT

has actually stated in their Knowledge Transfer and Innovation Strategy that their main aim is to assist the businesses in turning the innovations into the best commercial use that is possible. As the lack of clarity on who owns the IP rights is one of the main barriers to successful cooperation these issues should be handled in the very beginning when the collaboration contract or research contract is made. One other thing that might lead to problems in these matters could be that the universities themselves overvalue their intellectual capital, in which case it is very hard for the business to obtain any kind of legal use of them for a reasonable compensation. These kinds of issues are basically pointless, since all parties lose when the universities can't capitalise on their innovations, and the businesses can't capitalise on the commercialisation of these innovations.

4.7 SWOT

Now I will make a SWOT analysis of each of the HEI we have looked at earlier in this study. As a goal for the SWOT we will use strengthening, broadening and increasing the cooperation between the university and businesses in the region, nationally and internationally.

4.7.1 Fachhochschule Oldenburg/Ostfriesland/Wilhelmshaven

FH-OOW has a strong reputation among the businesses in its region. This can be demonstrated especially with the agreement they have with some of its long-term partner businesses that have agreed to offer their vacant positions to the students of FH-OOW before offering it to other people. The weakness in not doing more cooperation with businesses is that it deprives the school of more opportunities it could offer the students to make contacts with the businesses. Having e.g. different kind of research projects would also give the students some practical experience and a chance to make connections to the company already at an earlier point. FH-OOW could also keep closer relations

to some of the businesses and open up possibilities for new and younger partners to get acquainted with them and share information to get closer relations. For this also relates the second point which is that as there are two people working on maintaining the relations, the amount of conversation would have to grow a lot. The question would mainly be if the UAS could manage with two people handling them and would the UAS have the resources to hire more capable people.

Improving communication gives FH-OOW many different possibilities. Improving communication towards the students gives the students better understanding of all the possibilities the school can offer them from the businesses they are working with. The communication between the businesses and professors gives the professors more opportunities for their lectures and if the UAS would implement some other kind of cooperation with the businesses as well and the professors would be included in this cooperation, it would give them a more practical view for their lectures as well, not only theoretical.

If FH-OOW would include the institutes that are working beside it, or start-up its own cooperation with the businesses to make e.g. market research in the area, they could collect more financial capital to improve the UAS' operation and get an extra direction for its purpose. This would also open up more connections to the business world in the region. This would be even further enhanced by opening links to the other departments the UAS has, because as Schultze (2009) stated, they are now handling only connections to the business department, even though they have others that could benefit businesses and the departments could gain much as well.

A good point made by Schultze (2009) was that although they have career days, they are not on regular basis but are arrenged only sometimes. Arranging the career days on regular basis gives the businesses and students

more opportunities to meet each other and gives the UAS one more contact point with businesses.

Table 2: SWOT of Fachhochschule Oldenburg/Ostfriesland/ Wilhelmshaven

Strengths	Weaknesses
• Strong reputation in the region • Long-term relationships	• No research cooperation with the businesses • Amount of conversing with businesses
Opportunities	Threats
• Improve communication • Combine institutes to University • Include financial aspect to cooperation • Career days • Straight connection from companies to departments	• Lack of resources • Lack of experience with achieving targets with businesses

As FH-OOW has a strong reputation in the region, starting up e.g. research services could be costly, because as the HM Treasury (2003) found, one of the most significant problems with the knowledge transfer cooperation was that the universities sometimes have a hard time dealing with deadlines and that they might not be business oriented enough. If FH-OOW would start-up some kind of research operations, its reputation might suffer if it couldn't stand-up to the high expectations its earlier reputation has set up.

Another problem is that as it stands, the front office of FH-OOW is only handling the contacts for the business department. If other departments would be taken in, the number of contacts would most likely grow a lot, and whether the UAS would have the resources to employ more competent people, or even

the will, would be crucial. Also the number of contacts in the business department would grow as the range of services offered by the UAS would grow, so would the number of contacts.

4.7.2 Masaryk University

One of Muni's strengths is that it can choose its students from a very large pool of applicants because it is the second largest university in Czech Republic, and the biggest in Moravia. This ensures that they can always choose from the best, and have a steady stream of talented students to enrol to school. Getting talented students to the university works for the university in a variety of ways. It helps to get more interest from businesses who are interested in hiring talented students, and in Muni's case it also gives them a chance to get some new researchers to work with, as students who work their way all the way up to PhD level in their studies contribute often to the research efforts of the school according to Janouškovcová (2009).

The size and number of departments gives Muni an advantage in making connections with businesses since they have something to offer to basically all fields in business life. A good example of this kind of cooperation is the cooperation between Muni and IBM, which has a lot of different kind of projects going on with several different departments, especially the economics and informatics departments.

The lack of personnel at Muni is a big problem, which results in many different lost opportunities and possibly in a lowered level in the quality of the teaching. The most common result of this would be that professors simply don't have time to cooperate with the companies, even if they would have interest. A very good example Janouškovcová (2009) gave me was when previous year a professor had an innovation that a company wanted to finance to get the fundamental research improved. The company was willing to invest 1.000.000

Czech crowns in it, which is about 40.000 Euros. Only reason this didn't come into fruition was that the professor simply didn't have time to continue with his research, and nobody else could take over his tasks. This is also related to the other problem, which is financing at Muni. Another reason for the lack of cooperation between the university and businesses is that the personnel at Muni according to both, Janouškovcová (2009) and Pavlovič (2009), was that real interest towards businesses is very small. Even if businesses might have interest to offer funding or cooperation efforts, the professors of the field are simply not interested in it.

Table 3: SWOT of Masaryk University

Strengths	Weaknesses
- Large talent pool - Size - Variety of research	- Lack of personnel - Money - Lack of interest from personnel
Opportunities	Threats
- Improve need targeting - Create awareness	- Missing out on beneficial projects - Researchers losing interest - Dismissal of CTT - Budgeting

A big problem with starting cooperation with businesses is that often Muni doesn't recognise the real needs of companies so they could target them better. If Muni could find a way to find out what companies need and could use, it would increase their numbers in cooperation. This can be seen e.g. in that they don't offer their existing knowledge to their current partners actively, and in that they don't seek new partners enough. Creating awareness about the possibilities Muni has to offer is a key criterion for developing more successful partnerships in general. The crucial target group for this is actually the university's own students and staff. As Janouškovcová (2009) put it, many people don't even know the CTT exists. As many people at Muni don't know about them, they don't know about the possibilities they offer to staff and

students. Another thing is that the companies can't connect with the university as easily, when they aren't aware of the easy access point that there is to get connected with Muni. The difficulty of finding the people to contact can be a deterrent to companies.

There are two different threats that come together. The researchers at Muni sometimes lose interest in projects they have started, and this in turn leads to lost opportunities. The researchers sometimes finish their fundamental research, but even if they get funding for continuing it, it might be that they aren't interested in continuing it anymore but are satisfied with what they have already found. Muni has also missed opportunities by not identifying what the surrounding businesses require from them. Another problem is that because sometimes the businesses aren't aware of the existence of CTT, they talk directly with the professors. Problem with this is that the professor might e.g. overvalue his innovation, which leads to problems with the business. Another thing derived from this is that they don't know all the legislation that needs to be considered with the cooperation. The way that Muni makes their budget for projects is a problem for many businesses, as they don't know where exactly their investment has gone. As all their contribution is melt in, and the university only indicates the distributed money in percentages, the businesses are in the dark as to whether their support has been directed to the place where it was meant to go, or if they have used the money for something else than it was meant for. This causes distrust between Muni and the business and leads to lost opportunities and in lost possibilities for long-term relationship.

4.7.3   Dundalk Institute

One thing in which DkIT has been very successful is creating awareness of its existence and the possibilities it offers to businesses, students and lecturers of the university. This awareness is the result of publishing various newsletters and magazines, attending different fairs and making its own workshops, e.g.

science week, in which regular people can visit the grounds and see the benefits that businesses and normal people get from the cooperation and other activities it provides.

As one of the main objects of DkIT is to provide its knowledge and abilities to the use of the region, they have made special efforts to commercialise all their intellectual property rights, and other services they can provide the companies to improve their competitiveness. DkIT has made a plan for years 2009-2014 in which they state their goals for this time period for the cooperation and activities with businesses. They also state the aims and ways of how to employ more of their graduate and undergraduate students.

Table 4: SWOT of Dundalk Institute

Strengths	Weaknesses
• Awareness	• Cooperation within departments
• Commercialisation efforts	• Academic interest
• Internship offering	• Timelines
Opportunities	Threats
• Strengthening its programme offering	• Bureaucracy
• Promotional work	• Decrease in graduates

DkIT has a very strong offering of employment and internships. The university has a career centre in which students and recent graduates can register and get access to various job and internship offers. At this moment e.g. they are offering internships at Ernst & Young and KPMG. DkIT has very strong cooperation with some companies to try and offer the graduates some of the best placements there are. They also have an email service to registered users which informs about available jobs. The university has also people working in the career centre which are there to help students and graduates in the various challenges they face in their effort to become employed.

The biggest problem at DkIT considering the cooperation with businesses is that most academic lecturers are not that interested in the business side of things. This makes it more difficult to get the cooperation and studies underway, which businesses are looking for. This manifests itself so that the possibilities the businesses are offering the university, don't get started since the academics aren't interested in working together to achieve the goals set by the business. Another thing is that the amount of bureaucracy needed is very big. This is one of the obstacles on the way to efficient cooperation, because many of the businesses that come to them for cooperation purposes are on a very strict timeline, and the huge amounts of bureaucracy and paperwork that the university needs to do restrict the cooperation.

One alarming sign for DkIT is that the number of graduates and postgraduates have slowly but steadily been decreasing over the past few years. This is a problem when they often look for researchers from their own students, and use them in the cooperation with the businesses. This can in the long run also turn into a depletion of talent in their university, if they don't attract some of the most talented students in the future anymore. One way of strengthening their possibly depleting talent pool is to increase the number of graduate programmes to increase possibilities and interest towards DkIT. This way they might garner again more interest from students. Another way of attracting more students is to make more promotional work at lower educational levels to inform young people who are looking into applying to universities what DkIT can offer for its students.

As DkIT has big goals to make their school internationally known, they also have a massive organisation behind it. This amount of people and organisational build results in a lot of bureaucracy. This in turn results in long lead times, which may result in lost opportunities with businesses that require faster problem solving and reactions to changed market situations. So as the look for international recognition is a challenge, which requires a big

organisation structure behind it to succeed, building this organisational structure also threatens the current cooperation.

5 CONCLUSIONS

I found that the first step in transferring knowledge is to know where it lies in the organisation. As HEIs have knowledge scattered in many places, i.e. lecturers, researchers, staff, operative functions and students, for each knowledge transfer action the organisation should look where the most comprehensive knowledge and new innovations lie. Besides individual locations, the subnetworks should be examined closely to see what kind of operational improvements could be made.

The best way to make sure that these efforts have the best possible result, is to make sure that the networks which are cooperating together are also compatible with each other. In the case of cooperation between HEIs and businesses, most important is that both sides understand the needs of the opposition correctly and that people who have the correct kind of chemistry work together, as this helps to get the best benefit out of the cooperation. It is also easier to make these right decisions if HEIs and businesses are connected to each other in several ways, e.g. by discussing how to develop each other and cooperating also on an organisational level.

HEIs and businesses have cooperation on several levels. The most important level, as found in this thesis, is the knowledge transfer efforts between them. Knowledge transfer efforts manifest themselves in various different ways. These methods include consulting on different matters and areas, cooperation on an organisational level and researching new ideas which can be used e.g. for commercial benefit. For businesses these knowledge transfer activities are highly beneficial, and as found in this thesis, in most cases help them gain competitive advantages.

As found in my research, the co-operational activities between HEIs and businesses are highly dependent on what kind of an educational institution is in question, which kind of legal limitations they might have and what kind of limitations they have. These limitations could be e.g. lack of money or lack of resources in. Other problems may be the different perspectives the HEIs have compared to businesses as to what they want to gain from the cooperation or simply that the staff are simply not motivated or committed to the projects the educational institutions have going on with businesses. Sometimes if the HEI and business have developed a new idea, there can be problems in identifying who has what rights in regards to the made innovation.

There are several different kind of benefits for HEIs and businesses that come from cooperating with each other. Getting a different kind of perspective to current operations help to find new ways of thinking. This in-turn helps to create more competitive advantages to businesses. The HEIs may gain long-term relationships with the businesses, which gives them a larger knowledge base and access to business lecturers etc.

There are different ways I have recognised how these different problems could be solved. The partners should always look into how the perceived benefits that will come from the cooperation will be divided between them. As one of the big problems is to motivate the staff to cooperate, it should be looked into more deeply why they are not motivated. It could be that often these reasons can be resolved with a little patience and increasing understanding. In some cases the lack of money can be fixed if the HEI promotes its services to new businesses more actively than before.

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