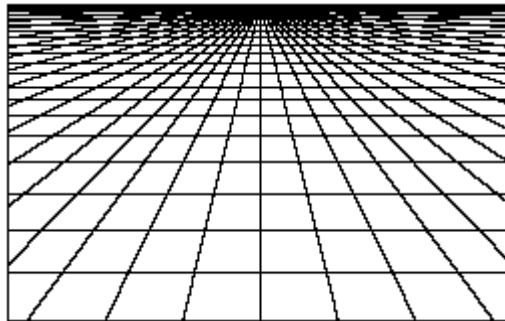




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INNOVATION IN NEW MEDIA FIRMS. THE ROLE OF UNIVERSITY LINKS

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Innovation and Economic Development in the New Europe: Regional, National
and Supranational Perspectives

2010

Word count: 17 544

Abstract

The study raises the question how (if at all) relations with university affect the innovativeness of new media firms in Skåne and to what extent it can be related to the type of knowledge base. The object of the analysis is 36 new media companies in the region. The data was selected using the methods of structured and semi-structured interviews. Open Innovation paradigm, knowledge base and knowledge transfer provide a theoretical framework for the analysis. The analysis reveals that there is a general trend for the innovativeness to grow when the value of ‘relations with university’ is growing and really high innovativeness is not possible without academia’s involvement in a form of ‘hard’ or ‘soft’ knowledge transfer. The effect of dominating knowledge mode in the company seems to be very small.

The majority of the new media companies operates or goes towards the Open Innovation paradigm. Openness, networking, and the use of external knowledge seem to be an important factor leading to innovative activities and together to successful performance in the market. Qualitative analysis shows that while the companies might have more or less formal links with universities, all of them see it as an important actor in their knowledge exchange network. The relations with academia not only provides access to university knowledge or helps to develop new technology, but increases the chance for getting financing (essential input for innovation activities) as existing policies tend to support academia-industry partnership and leads to the changes in company’s social responsibility activities.

Keywords: Open Innovation; Knowledge transfer; Innovation performance; New media

Acknowledgements

First and foremost I would like to thank my supervisor Dr. Jerker Moodysson for his help, comments and support throughout the whole thesis writing process. His valuable insights and encouragement were crucial for this thesis to be accomplished.

Special thanks for all the respondents in the companies that dedicated their time and answered my questions.

Juhan Jürriado, Ayumi Nakamura, Josefine Fischer, Fumi Kitagawa participated in the data collection process. Thank you all for that.

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Introduction

For more than a decade the contemporary economy has been described as 'knowledge-based'. This means, that knowledge has been recognized as the driver of productivity and economic growth, leading to a new focus on the role of information, technology and learning in economic performance (OECD, 1996). As knowledge creation has an impact on economy and innovation is a matter of producing new knowledge or combining existing (and sometimes new) elements of knowledge in new ways (Edquist, 2005), one can say that innovation is a driver for economic development. The very first author of this idea is Schumpeter who in the first part of 20th century described economic development as a process of qualitative change, driven by innovation, taking place in historical time (from Fagerberg, 2005).

Systems of innovation approach claims that firms do not innovate in isolation, but interact with other organizations (Edquist, 2005). As universities are important and useful generators of knowledge they become crucial partners in innovation activities (Coenen, 2007). According to the framework of constructed regional advantage (Asheim et al, 2006), public sector (especially universities) should take more active role in collaboration with industry. Traditionally associated with basic research, education and peer-review, universities have been also asked for social and economical accountability (Steen and Enders, 2008).

These changes created new opportunities and challenges for academia. The new concepts of 'academic entrepreneurship' and 'entrepreneurial university' were introduced in the academic analysis of university-industry relations. Four major research streams emerge in this area of study: entrepreneurial research university, productivity of technology transfer office, new firm creation and environmental context including network of innovation (Rothaermal et.al., 2007). Rothaermal et.al. (2007) taxonomy of the literature revealed that in most articles the unit of analysis was university. Authors analyze such questions as

organizational change at individual level of academic entrepreneurs (Bercovitz and Feldman, 2008), offer typology of academic entrepreneurship and discuss its implementation (Klofsten and Evans, 2000), present possible negative consequences and threats (Geuna, 2001; Hellström, 2004; Evans, 1999). On the other hand, the literature, analyzing how this collaboration affected firms concentrates mostly on high-tech sectors such as ICT, biotechnology. In many cases the companies were affected through technology transfer – licensing and spin-offs activities¹. The research on innovation networks highlights the benefits of such networks to technology-based firms (Rothaermal et.al., 2007). Additionally, the majority of studies concentrate either on large enterprises with developed R&D activities (among others Fabrizio, 2006) or spin-offs from university (Grandi and Grimaldi, 2003; Johansson et.al, 2005; Pérez and Sánchez, 2003). The discussions on academia-industry relations' impact on other type of firms are lacking.

Some recent studies have aimed to shift the focus from highly R&D intensive sectors towards the creative, such as art, media, cultural, industries in innovation literature. The argument for that is that “once marginal activities now have significant market value and contribution to individual wealth and GDP” (Potts etl al., 2008:168). They also produce the dynamic service of re-coordination of the socio-cultural and economic order to the ongoing growth of knowledge process. It is this latter aspect – this input into the innovation process – that properly connects creative industries to the arguments of innovation systems and policy (Potts, 2009). However, these studies mostly concentrates on the effects of creative sectors on wider economy (Müller et. al., 2009; Bakhshi and McVittie, 2009) or try to apply innovation system or cluster theoretical approach to the phenomenon (Davis et. al., 2009; Jaaniste, 2009; Gwee, 2009, Vang and Chaminade (2007)), rather than analyze in depth academia-creative industry links.

¹ Look for example at Link and Siegel (2007). The detailed account on this literature can be found at Rothaermal et.al., 2007.

The aim of this thesis is to analyze how (if at all) relations with academia affect the innovativeness of new media firms.

The analysis of new media companies could at least partly fill the gap in academia-industry relations study field. New media is a creative/artistic sector that is continuously challenged by the emergence of new technologies, but because of its creative nature it would not be correct to define it as only high-tech or technology based sector.

According to Asheim et. al. (2007), there are three types of knowledge bases: analytical (scientific), synthetic (engineering) and symbolic (artistic)². Knowledge creation and mode of innovation of firms are strongly shaped by their specific knowledge base. Firms, operating in new media sector, are specialized in different fields (from films production to engineering, programming, web development), which require specific knowledge. This analysis could reveal what are the links between innovativeness, relations with academia and dominating knowledge base in a company.

The **research question** is:

How (if at all) do relations with universities affect the innovativeness of new media firms in Skåne? To what extent can it be related to the type of knowledge base?

To answer the question, the following **sub-questions** are raised:

- What are the channels for transferring knowledge from university to the company?
- How important are those channels?
- How do the relations with academia and innovativeness differ depending on the knowledge base?

My working **hypothesis** is that the rate of innovativeness will be higher in the companies with dominating analytical and synthetic knowledge base if they collaborate with

² The detailed description of the knowledge base framework is provided in Literature review section.

university, while in firms with dominating symbolic knowledge base university will not affect the rate of innovativeness to the same extent.

Region of Skåne (mostly cities of Malmö and Lund) is chosen because there is a new media cluster here. It has been developing from traditional movie industry to graphic design, web creation, and management consultancy using the possibilities created by new ICT technologies. There have been a number of regional policy initiatives, such as Moving Media Southern Sweden, Moving Media City, Wireless Valley, encouraging this development. Additionally, these companies are in close geographical proximity to Lund University and Malmö Högskola. Though, the affect of relations with academia is not analyzed only in a regional level, such proximity increases the chance of industry-academia collaboration.

This research lies in the area of society, science and technology framework. SST approach is based on studies of science/technology and economy/society. It is engaged in the research of social and economic analysis of innovation (among other topics)³. This thesis provides a social analysis of innovation (company's social networking with university's impact on innovation). It also relates science/technology (university) and economy (company in a private sector). That's why it is relevant for the master thesis in the field of ESST.

The thesis consists of four parts. The concepts of open innovation system, new media and knowledge transfer, the framework of knowledge base are discussed in the part of literature review. Methodology presents the chosen methods and empirical case. The empirical findings are discussed in analysis part, while concluding part connects them with theoretical discussion.

³ According to the information at SST website <http://www.esst.eu/master/info.html>

Literature Review – Theoretical Framework

As noticed by Rothaermel et. al. (2007) the research branch analyzing academia-firm relations or in other words university entrepreneurship is relatively new field of inquiry. The new theory specifically for the realm of university entrepreneurship is lacking. Nevertheless, some terms were introduced, paradigms and frameworks developed. Further on, the ones, chosen for the analysis in this thesis, are discussed. Additionally, the term of ‘new media’ is defined in order to avoid misconception in the thesis. Together with that, the short review on creative or cultural industries in innovation system literature is presented. University is one of innovation system actors or one of supporting organizations in a cluster. So the review might suggest some valuable insights for further discussion.

New Media – Defining the Term

There is no one clear definition of the term ‘new media’. Notions as digital media, new media, moving media, cross media are often used as synonyms without defining the boundaries between them. There is no one sector in the classification of NACE codes that could include all new media companies. The adjective ‘new’ is even more relative as the novelty depends on “who is talking and who is remembering” (Peters, 2009: 20). To justify the inclusion of certain companies in the study, the clarification of the term in this thesis is needed. Peters (2009:19) offers two ‘new media’ definitions. According to him, “new media can be understood as emerging communication and information technologies undergoing a historical process of contestation, negotiation and institutionalization”. These technologies pass through five different periods:

1. technical invention – during which media are recognized rarely as ‘new’ and usually thought of as ‘old plus’;
2. cultural innovation – during which media develop new social uses;

3. legal regulation – during which the interested parties explicitly contest and negotiate for media power;
4. economic distribution – which continues until media become
5. social mainstream – the point at which media are no longer new.

The second definition says that “new media are media we do not yet know how to talk about. They are uncertain objects, their terms are unclear; their use, purpose and impact are not yet fully understood” (P. 20). Peter’s example of such medium is TV as videophones, online cables and other things change the mode of TV and make it harder to talk about it. He offers to use these two definitions together, while studying ‘new media’. This combined approach is chosen in the thesis as it represents best the variety of activities in which analyzed companies are involved.

Creative Industries in Innovation Literature

Miles and Green (2008) noticed that research studies of innovation in the creative industries have been few and far between. However, these industries are highly innovative. The authors describe the innovations in creative industries as ‘hidden innovations’. By that they mean innovation without a major scientific/ technological basis, such as innovation in organisational forms or business models; innovation created from the novel combination of existing technologies and processes and other types of innovations which are excluded from traditional indicators measurement. The main drivers for innovation in creative industries first of all are new information technologies. They affect not only product, but also allow more sophisticated market research and innovation marketing, as well as enables new organizational structures (hiring of free lancers, networking ect.). The other important driver is consumers that are becoming more sophisticated, networked and active. Innovation activities are also affected by increased competition, functioning in international

markets, intellectual property rights (changes might be driven by increased pirating problems).

This study is a general overview on innovation activities in creative industries in the UK context. Authors do not elaborate on university-industry knowledge transfer, neither have they aimed to analyze if the firms that have relations with university are more innovative than others.

The only findings that are related with the university suggest that:

University links are limited for innovation, though graduates provide vital technical skills. However, communities of practice – professional associations and more informal groups – are an extremely important source of new ideas (Miles and Green, 2008:7).

The importance of networking and personal relations for innovation activities are highlighted by a few other studies in the field. Picard (2008) says that personal relations have always played central role in creative industries and the networks of relationships are critical for the operation in media cluster. Davis et. al. (2009) who analyzes Ontario screen based media industry, describes creative cluster as geographically concentrated, highly networked and generally focused on content and product innovation. The relations with universities are mentioned very briefly in both studies and are contradicting. Picard (2008) highlights that media clusters are situated in urban areas because of educational and research institutions which imply that those institutions should be important for the functioning of the cluster. While Davis et. al. (2009) suggest that linkages with R&D institutions are based only on technical needs in digital media.

Several other studies highlight the importance of university or research institutions in creative clusters' policy directives. Gwee (2009) discusses the components of creative industries innovations systems and includes such aspects as encouragement of competition and a transfer of knowledge from public to private sectors, and vice-versa, the development of critical thinking skills, problem-solving skills, and specialised skills in

education, while catering for the evolving needs of the creative industries and its related sectors. The author also presents what actual policies, schools and study programmes were introduced to support the creative cluster in Singapore. However, she does not discuss if the changes in education affect the performance of the cluster. The impact of universities is not elaborated. Similarly, Lee and Chan (2008), while proposing the idea of Integrated Creative Platform in China, say that design and education institutions in Hong Kong could act as “knowledge transformer” transforming world class knowledge and practices to be localized and implemented. Jaaniste (2009) discussing the movement towards a mature field of creative sector innovation highlights the importance of the following questions:

how can the education system better serve the innovative dynamics of each domain of the creative sector?

how can each domain produce experimental research and the production of new knowledge?

Summarizing, most of the innovation studies present university as an important actor, influencing the performance of the creative sector. But they do not analyze in what ways and how university can influence the firms, how the knowledge is transferred and how it affects the performance.

Theoretical Concepts

Knowledge Base

Different activities require differentiated knowledge base that leads to different kind of innovations. Asheim et al. (2007), suggests the differentiation of knowledge into:

- Analytical (science based);
- Synthetic (engineering based);
- Symbolic (artistic based).

Analytical base develops new knowledge about natural systems, by applying scientific laws. It could be defined as ‘know why’ type, is strongly codified, highly abstract and universal. Companies with dominating analytical knowledge base usually have more frequent links with university, and the staff that has university training and research experience.

Synthetic base applies or combines (in novel ways) existing knowledge. It could be defined as ‘know how’ type, is partially codified, strongly tacit, more content specific. University-industry links are sometimes relevant in the companies with dominating synthetic knowledge base, but mainly in the field of concrete knowledge application. The staff usually develops the skills through on-job training or at professional schools.

Symbolic base creates meaning, aesthetic qualities. It could be defined as ‘know who’, is strongly semiotic, some forms are highly content specific. This type of knowledge base dominates in such cultural industries as media (film making, publishing, music, etc.), advertising, design or fashion (Scott, 1997, 1998 in Asheim et. al., 2007) and the use of narratives. The projects with dominating symbolic knowledge base appeal to imagination as a way of adding value to products. The development of staff’s skills is less tied to formal qualifications and university degrees than to practice in various stages of the creative process.

This typology is a useful tool to study new media companies as they do not fit into Pavitt’s (1984) classification of high-tech, medium-tech and low-tech sectors. Some of the companies produce information and communication technologies, while others are strongly dependant of these emerging technologies and opportunities they create. These companies use the technology to create cultural artifacts. The knowledge base approach enables to combine different activities within the sector.

In this thesis the technology based firms are classified as mainly using the combination of analytical/synthetic knowledge, while artistic ones symbolic. The difference

between analytical and synthetic modes is not taken into account, because, firstly, the innovation is a result of both and secondly, it is firm's relation with academy that is in focus, not the relation in different stage.

Open Innovation Paradigm

Chesbrough (2003) defined and developed the open innovation paradigm. This paradigm is chosen in the thesis for a few reasons. First, contrary to other frameworks (e.g. Triple Helix, by Etzkowitz and Leydesdorff, 1997) it puts the firm in the centre of analysis, it is a firm that makes decisions to create various linkages (be open) to universities and other parties. Secondly, it admits university as an important partner in firm's innovation activities. Finally, although author's analysis is based on high-tech firms such as Xerox or IBM, he says that "the concepts in this book are not specific to the high-tech portion of the overall economy" (Chesbrough, 2003:xxvi) or "limited to a small number of companies operating in a small number of US high-tech industries" (Chesbrough, 2006). It follows it might be adjusted to a creative new media sector in Sweden.

Chesbrough (2003) offers a new business model, how using the external and internal knowledge and external and internal paths to the market to provide a value for the company. For the purpose of the thesis only the ideas of university as external knowledge pool is presented. Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market. The knowledge that a company uncovers in its research cannot be restricted to its internal pathways to market. Similarly, its internal pathways to market cannot necessarily be restricted to using company's internal knowledge. The idea of open innovation is based on the fact that "useful knowledge is generally believed to be widely distributed and of generally high quality" (Chesbrough, 2006:9). It happened due to increased labor mobility, increased amount

of well educated people, new ICT technologies, which enabled creation of public scientific databases and online journals, and many other factors. This leads to different way of organizing innovation activities. It also makes university an important pool of external knowledge that might be transferred and commercialized in the company. According to Liu and Sharifi (2008) when in industry business model turned to open innovation, the university has not only been deemed as the key source of innovation, but also has broadened its perspective to serve as a public ‘hub’ for regional and international stakeholders to exchange ideas and connect to global economy.

According to Chesbrough (2003:53), in the new paradigm, “the company’s businesses cannot (and should not) wait for the internal technologies to arrive; instead they should access what they need, as soon as they need it – either from company’s own research labs or from knowledge created in someone else’s lab”. Company’s R&D should be understood as an open system (Chesbrough, 2006).

The open innovation paradigm is used in a broader way in this thesis. It is claimed that knowledge is created not only in the labs and it is not only technologies that are changing quickly. Markets, processes, the ways products/services are made are in constant change. Firms cannot get all the new ideas only from inside. In order to innovate they should get new ideas continuously if not from internal when from external sources. “Companies that do not innovate die” (Chesbrough, 2003:xxvi). Following the idea of open innovation, I argue that all company’s innovation activities can be treated as an open system.

Knowledge Transfer

According to open innovation business model, “key factors for sustaining competitive success include the ability to gain differential access to key resources” (Chesbrough, 2003: 68). Actually, knowledge, ideas are key resources in knowledge

economy. Universities, as knowledge creation and dissemination organizations, cooperating with different actors, analyzing various processes might be useful partners in this process. Liu and Sharifi (2008) adopt the value chain concept as a framework to map the knowledge diffusion process. One of the key factors in the value chain is openness. This implies that the university transfer stakeholders form a network, through which stakeholders can create value and distribute value. The knowledge transfer network is able to boost the internal and external knowledge flow by fostering the problem solving and organizational learning. The idea of mutual value is also implemented in open innovation business model which is understood as “the source of both value creation and value capture” (Chesbrough, 2006:2).

Johansson et. al. (2005) discuss ‘moral’ values of networks relations between university-spin-offs and universities. One of the vital factors for university-industry linkage is trust which exists “if both parties expect the other to work towards mutually compatible or supporting interests in a joint effort” (Das and Teng, 1998 in Johansson et. al., 2005). Another factor, according to the authors, is mutual exchange of knowledge that means the ability to learn from each other. This attitude favors collaborative research to contract research. As the first one provides much bigger learning opportunities for both sides. Finally, the importance of building a mutual language and symbols in order to foster trust, and thus to increase the likelihood of sustained collaboration is highlighted (Carayannis et al., 2000 in Johansson et. al., 2005). Although, universities’ spin-offs are specific type of companies, these set of values can be adjusted to any kind of university-industry network. Trust, mutual exchange of knowledge and building of mutual language and symbols are needed. Otherwise there is a threat that universities would feel totally detached from essential scientific values on the one hand, and companies would treat the relations with academia as waste of their resources on the other hand. Additionally, trust, mutual exchange of knowledge and building of mutual language and symbols can help to avoid ‘not invented here syndrome’. This syndrome is a

burden to open innovation as is partly based upon an attitude of xenophobia: we can not trust it, because it is not from us (Chesbrough, 2006a).

Chesbrough (2003) defines a few ways how universities' knowledge might be transferred and used in the company. The author offers to employ university professors for a summer to work along with firm's people, or some graduate students of a professor, invite students to do class projects at the company, sponsor a graduate student's tuition for a year and learn about his/her studies. The further option is to fund external research and gain early access to results. In all the cases highly capable employees is always success. Publications, journals provide the opportunity for the companies to get new knowledge and build on those ideas in their own business.

The open innovation literature has focused primarily on the knowledge and ideas flowing from one firm to another. The open innovation website⁴ that among other things provides bibliography within the field includes only one study that adapts open innovation paradigm and analyzes how university research is used in firm's innovation. The study is done by Fabrizio (2006). It is an empirical investigation of increasing formal intellectual property rights on the use of university research in industrial pharmaceutical and biotechnology innovation.

The author argues that to successfully embrace Open Innovation paradigm, firms must develop the ability to identify, assimilate, and make use of external knowledge and ideas. In the case of university-industry based research knowledge, publications and disseminations of research results contributed to industrial sphere knowledge development. Further on Fabrizio (2006) discusses the benefits of open science system to Open Innovation paradigm. Together with the fact that this system promotes information sharing it also

encourages both the dissemination of codified research results (through publication and the like) and the transfer of the complementary know-how. (...) This system has clear benefits for open

⁴ The website can be accessed at www.openinnovation.net. Last accessed by the author 2009-11-25.

innovation, as it encourages contribution of research knowledge to the knowledge landscape from which firms can draw and interactions, which facilitates knowledge transfer to industry. (P.138).

The author draws this description in the contrast to private science and exploitation of IP rights that emerge in the US universities after the Bayh-Dole Act was established. However, the parallel between open science system and Open Innovation paradigm can also be noticed. Openness in science leads to creation of new knowledge, while in industry collaboration and sharing may create the opportunities for different innovations. This parallel suggests the idea that traditional academic and industrial values do not necessarily have to contradict with each other as it was argued by many authors (among others Geuna, 2001 and Helstrom, 2004).

Fabrizio's (2006) IP analysis reveals that firms benefit from public science. However, university patenting slows down knowledge transfer and in turn open innovation in the industry. He concludes that interaction between university researchers and industry researchers as well as continued investments in basic research is important to knowledge and technology transfer process.

University-Industry Relations

There are a number of studies, analyzing how university-industry knowledge flows have affected firms. The limitation of those studies is that in most cases knowledge transfer first of all is considered as technology transfer (e.g. Kliknaite, 2009), the impact on technologic performance or industrial R&D is analyzed, while other aspects are lacking. Nevertheless, it is worth to discuss what channels are found to be most important for such transfers and what the outcomes are.

Cohen et. al. (2002) evaluate the influence of “public” (i.e., university and government R&D lab) research on industrial R&D, the role that public research plays in industrial R&D, in technical advanced manufacturing sector, and the pathways through which

that effect is exercised. According to the results, public research is critical to a small number of industries, although it is “moderately important” across a broad swath of the manufacturing sector. As public research can do different things in different industries, authors claim it should not be surprising that it is not just R&D of high-tech industries that benefit from public research. Developing this idea further, I argue that relations with universities might influence not only company’s R&D, but innovation performance in general and might be at least moderately important even for the firms that are not involved in R&D activities.

According to Geuna and Muscio (2009:95) there are various forms of knowledge transfer activities, ranging from collaborative research, intellectual property rights, spin-offs, labour and students mobility, as well as “soft” forms of knowledge transfer such as attendance of conferences and creation of electronic networks. Traditional channels are considered to be personnel exchange, publishing, consulting and conferences.

Discussing the channels, Cohen et. al. (2002) say that the most important channels for accessing public research appear to be the public and personal channels, such as publications, conferences and informal interactions. Bekkers and Freitas (2008) analyzed the relative importance of a variety of channels of knowledge transfer between university and industry and got very similar results. The most important channels (in this range of importance) happened to be publications, patents texts, personal informal contacts, university graduates as employees, conferences and workshops, joint R&D projects, students working as trainees. According to Cohen et. al. (2002) , it follows that the most important channels are relatively decentralized in the sense that they do not typically reflect formal institutional links and are also not mediated through any sort of market exchange.

This contradicts to Zucker’s et. al. (2002) findings that localized knowledge impacts of universities on industry are associated with market transaction. These Zucker’s et al. results might be affected by the field of analysis – biotechnology where collaborative

research is more important than in many other industries and the chosen aspect – collaborative research between firm’s scientists and top research universities scientists. Nevertheless, their finding suggests an interesting argument that a firm should seek university knowledge consciously, with a goal. The university knowledge cannot flow to the company by itself and spill over the company if it does not open any channels for that. This idea is also supported by Rotaermel and Thursby (2005). The authors argue that university knowledge, albeit publicly available, is far from costless. Firms must build internal capabilities to evaluate external research and apply it to commercial ends. Pérez and Sánchez (2003) add that setting up an efficient network requires considerate resources (effort, time, money). Fabrizio (2006) claims that making effective use of university knowledge requires firm investments in internal research expertise and collaborative networks with external scientists. It follows that if firms want to benefit from university knowledge they should invest at least time and human resources in order to achieve them and investment is always a motivated and conscious act.

The idea that university knowledge is beneficial to the industry has been supported by many authors. Among them Zucker et. al. (2002) revealed that collaborative research with star scientists has a significant positive effect on a wide range of firm performance measures in biotechnology. Henderson and Cockburn (1994) find that large pharmaceutical firms that promote researchers based on scientific publication and standing within the scientific community generate more important patents. It has also been proved that 10% of the new products and processes introduced by the firms would not have been developed (or only with great delay) without contribution of university research (Mansfield, 1991; Beise and Stahl, 1999). Pérez and Sánchez (2003) noticed that information gathered from the network (and university together with a firm is part of that network) contributes to the growth of the company by strengthening understanding and intuition.

The Need to Fill in the Gaps

The limitations of those studies are that they all are based on the sectors with dominating analytical and synthetic knowledge base while any sector with domination of symbolic knowledge base has not been included. As noticed by Asheim et. al. (2007) all economic activities are based on knowledge and learning. There is the increased importance of knowledge creation in all segments of society and economy, including traditional industries, services and emerging sectors such as creative industries. So it might be that it is not only technology that matters in the case of knowledge transfer and universities might be beneficial not only to R&D activities, but also to overall firm performance or improve the innovativeness of the firms that are included in non R&D active sectors. In this context, such a creative sector as new media that has been under tremendous change in recent decade and where many innovations have been appearing is an interesting field of industry-university relations research.

Methodology

For answering the research question I choose collective case study approach. The main advantage of case study is its transparency and provision of detailed knowledge about one single firm or one single project (Wieser, 2005). The collective case study approach studies several companies together with the same focus. In this research new media companies in Skåne, mostly in Lund and Malmö, are studied, focusing on the impact of relation with university on firms' innovativeness.

Part of the information is collected using structured interviews with companies' representatives⁵. The structured interviews enable to compare data collected in different firms with different activities.

It has been taken 36 about one hour interviews with new media firms' representatives. Mostly CEO, general managers or entrepreneurs⁶. The respondents were asked 27 questions, regarding general information about the company, knowledge exchange about the market, knowledge exchange about the technology, innovation performance and policy initiatives. Only a part of this data is being used in this thesis.

Interviewed companies represent the whole variety of activities in the new media field. Some of them specialize in ICT and are in different phases of technological development. Other belong to the media "we do not yet know how to talk about" (mentioned above), including films creation, advertising and PR activities. (The detailed account will be provided in the following section.) Depending on the specific activities every company was classified according to three digits NACE codes system. Using this classification, I divide the companies into the ones, dominated by analytical/synthetic (ICT) and symbolic (artistic) modes of knowledge creation.

Relations with University

Universities are knowledge creation and dissemination organizations. Naturally, mainly through the knowledge universities may contribute to the innovativeness of the firms. Due to the characteristics of new media sector the following channels are most relevant for analysis: employment of the staff with higher education (according to Tao (2009) companies expect that graduate (...) improves companies' operation efficiency, so the actual existence

⁵ The structured questionnaire was created by the coordinators of the project 'Constructing regional advantage: towards state-of-art regional innovation system policies in Europe'. It can be found in the Appendix 1 of the thesis.

⁶ 11 of the interviews I have taken myself, while others were taken by other members of the project

and importance of such employees reveal if university is important in achieving and developing needed competences of the staff), ‘hard’ knowledge exchange (through collaboration, consulting ect), ‘soft’ knowledge transfer through academic journals (publishing)⁷.

To measure the university-firm relation in this study the following indicators are chosen:

- percentage of the employees with higher education,
- importance of university for recruitment of future employees,
- importance of academic journals for achieving market and technology knowledge
- importance of university knowledge achieved through direct knowledge exchange.

Every indicator is given the value from 1-5, depending on how big the percent or how important the particular indicator is. The final value of ‘relations with university’ (RUV) is counted by adding the value of every indicator. The maximum value can be 25 points. The more channels and the more intensive the company uses the bigger amount of university knowledge can be transferred.

One could argue that different channels could have been given different weight as collaboration with university might be more beneficial for knowledge transfer than academic journals. However, in this thesis all indicators are given the maximum value of 5. Partly, it is dictated by the structure of questionnaire. Additionally, the argument why one indicator should be more important than the other would be very subjective. While some channels might be more intensive (like collaboration), the other ones might be more accessible and wide-spread (like publications), that is why it was chosen to give the same weight to every indicator.

⁷ Knowledge exchange is divided into ‘hard’ and ‘soft’, following Geuna and Muscio (2009).

Innovation Performance

Following Schumpeter in this thesis innovation is understood as new products, new methods of production, new sources of supply, the exploitation of new markets, and new ways to organize business (Fagerberg, 2005). So by definition innovation is novelty. It is the creation of something qualitatively new (Smith, 2005). The question how to measure innovation performance has been in focus of many authors within innovation literature field. According to Smith (2005), innovation involves multidimensional novelty in aspects of learning or knowledge creation that are difficult to measure or intrinsically non-measurable. Different indicators have been chosen to measure innovation performance in new media firms. Although, it is kept in mind that innovativeness can never be totally captured. It is closely related to such immeasurable characteristics as personal qualities, entrepreneurial spirit, the insight of the personnel within the firms and others.

First of all the respondents are asked if their firm achieved any novelty such as:

- products/services,
- strategy,
- organizational structure,
- market concept.

This is an initial question to measure if any innovative activity as such is taking place within the firm. This also enables to grasp the ‘hidden innovation’ manner in creative sector. While analyzing data, every introduced innovation is valued as 5. If that type of innovation was not introduced, it is valued as 0. In the case of product innovation, there has been made the distinction between the products that are new to the firms’ market or just new to the firm. If the new product is also new to the firm’s market, such innovation is valued as 5, if it is new just to the firm as 3. There are a number of things that a company that copies a product from the market should do. Firstly, it should scan the environment for possible profitable products.

Secondly, it should improve and develop new skills, required for the production of particular product and finally introduce or adapt production process. It follows that the firm that copied the product from the market is less innovative than the one that created it originally, but more innovative than the one that did not introduce any product innovations. That is why the product innovation indicators' weights are 0, 3 and 5.

The turnover of the company from new products (in percents) is one more indicator of innovativeness. This indicator measures the output of innovation and is easily applied for both – technology based and artistic firms. The percentage is turned into 1-5 scale to normalize it with the other indicators for the innovation performance. The limitation of this approach is that some companies are still in the initial stage of technological development. That's why there is no any turnover yet and all business is based on venture capital. In such a case the turnover is omitted when counting the rate of innovation performance. Other indicators are used instead.

One of such general indicators is input to innovation. As noticed Arundel (1997:6) “when we talk about a firm expending a great deal of effort in innovation, we are not only speaking of financial investments, but of the use of human capital to think, learn and solve complex problems and to produce qualitatively different types of innovation”. That's why the input is not defined in financial terms, but in time or amount of employees devoted to the creation of innovation.

This question about time (not only amount of employees) was added in the process of the project when it occurred that in small companies the probability of full-time personnel for such activities is low. That's why the data is not given by all the firms. In the cases where the full-time employees were known, the time was found out by counting the percentage of full-time innovation devoted employees from the whole number of employees. Like in other cases, the percentage is turned into 1-5 scale to normalize it with the other

indicators. (This data is not available from 5 companies and this indicator is excluded while counting their rate of innovativeness).

The last indicator for innovation performance is patent. Patents have different weaknesses. One of them, as noted by Smith (2005) they are an indicator of invention rather than innovation; they mark the emergence of new technical paradigm, not a commercial innovation. Kleinknecht et. al. (2002) adds that sometimes firms do not intend to commercialize the invention, just to prevent competitor from using it. But on the other hand, for application to be patentable it must fulfill three criteria for patentability:

I. novelty;

II. inventive activity;

III. industrial applicability. (Michel and Bettels, 2001:187)

It means that patent is an invention with commercial promise. In the case of this study, it is very likely that if small new media companies went through quite expensive and complicated process of patenting, they intend to turn their inventions to innovations.

Kleinknecht et. al. (2002:122) point out one more patent's limitation. He says "some types of technologies are not patentable" (cited from Smith, 2005). I would add that in the case of new media some innovative activities are not patentable. Still it is useful to use patent as an indicator. Some types of innovations can be indicated using the number of patents, while other innovative activities are measured by different indicators, mentioned above. The patent indicator is valued according to the number of patents (1 point per patent). The indicator is valued as 5 if company applied for 5 or more patents.

The rate of innovativeness is counted by adding the values of every available indicator and dividing it from the numbers of indicators (arithmetic average). This approach lets to compare the rate of innovativeness among companies even when one or more indicators are missing or are not applicable for the company.

Research Design

The data is analyzed, using the combination of quantitative and qualitative approach. First, companies are given id numbers as all firms were promised to be treated anonymously. Second, all the indicators are summarized in the table1 in Appendix 3. It also includes an absolute value for relations with university and innovativeness rate for every company. Third, all the companies are divided into low (0-2), medium (2.1-3.4) and high (3.5-5) innovativeness and high (15-22), medium (8-14) and low (0-7) relations with university value in order to discuss the trends within each group. (The tables with the data can be found in Appendix 3). Fourth, every indicator is discussed, looking for relations with other indicators, and including other factors, that might have had influence on the results, such as age or size of the company. It is complimented with the information that was not codified in the questionnaire, but was written down in the form of notes. In some interviews the respondents not only gave numbers, while evaluating importance of university, but also supplemented with interesting comments on why academia is or is not important in their work, in what ways knowledge exchange take place ect.

This classification and analysis provides the basis for the selection of 4 cases for the in-depth interviews in order to get a deeper insight of university's role for innovativeness in new media sector. The four companies are chosen according to several characteristics. Firstly, they represent different knowledge base (2 – analytical/synthetic and 2 symbolic ones). Secondly, they represent different values of university relations and innovativeness rate (a more detailed explanation will be provided in the following part). Finally, it depended on the willingness of the companies to participate in the project.

To collect the information the method of semi-structured interview is chosen. The prefix 'semi'-structured refers to the fact that the interviews are composed of open-ended question which are structured thematically, which allows for controlled flexibility in the

interview situation (Silverman, 2001). The thematic structuring is based on previously made structured interviews in order to compliment quantitative results. It includes such qualitative characteristics as absorption of knowledge – how actually the knowledge transferred from university is used in innovative activities, if it affected and to what extends the actual production of new products or services, why companies seek that knowledge. The other important qualitative characteristic is time efficiency – how time devoted to development of new products/services is actually planed, how these new innovations is actually happening. The questions can be found in Appendix 2. The findings of each case are grouped and discussed in two sections – the importance of university links and innovation performance.

All the findings are summarized in the final part of analysis. It relates the trends found in the 36 cases with the deeper explanations of 4 case studies and provides the analysis of the impact of relations with university on a firm's innovativeness.

Limitations of Methodology

The limitation of this methodology is that it relies a lot on the subjective perceptions of respondents within a company. Such indicators as importance of university education, knowledge, academic publications, even turn over from innovations and time dedicated to innovations are given their values based on respondents' points of view only. The results achieved in this way are much more subjective compared to the ones, based on actual project data (e g. the percent of the projects with university staff or students involved). This limitation was partly solved by four cases studies where more detailed data on innovation performance and relations with university were collected. Nevertheless, in the future research it would be interesting and useful to include data, based on documentation in a company, rather than just respondent's opinion.

Analysis

The empirical case consists of data collected in 36 new media companies. 10 of them are specialized in film production (3 of them are additionally engaged in graphic design), 5 in design, 3 in advertising, 6 in management and consultancy, 6 in computer programming, consultancy and related activities, 1 in engineering, 1 in telecommunications, 2 in software publishing (1 of them additionally engaged in advertising), 1 in creation of games, and 1 in books publishing.

All these companies can be included in combined definition of new media. Computer programming, engineering and telecommunication belong to the ICT field. Some of these firms are at the initial stage of the technology development while others are in constant renewal. Some of their technologies have already reached economic distribution or even social main stream, while others are being at the initial stage. The rest of 29 cases belong to the media we do not know how to talk about. Film production can be defined in the same words as television above. Online cables, mobile television, youtube and similar projects changed the mode of film production. Such an old media as books publishing is also challenged by new technologies. Paper versions often include interactive opportunities in the forms of dvd or links in the internet. Creations of games and software publishing (that most often is computer games publishing) are new forms of entertainment media. If 'new' can be described as 'most new' when advertising and management and consultancy are definitely the ones in new media branch. The firms, included in this study, create new opportunities for their clients, using the possibilities of web-developing, motion pictures, animation and others. Further on in the thesis, 8 ICT companies are classified as technology based with dominating the combination of analytical and synthetic knowledge. Other 28 are artistic ones with dominating symbolic knowledge base. A firm is classified as technology based if it develops any ICT technologies (despite of the fact that some of the technology firms do both – develop

new technologies and create new design). If a firm only uses the technologies, developed by others, it is classified as artistic based. The distribution is not even as the list of the companies was provided by regional policy makers, according to the data of participants in seminars for new media firms. Sectors of their activities were identified later.

Relations with university

Relations with university were measured using the indicators of employees with higher education within the company, importance of university education for recruitment of future employees, the importance of knowledge got from university for innovation performance, the importance of academic journals as the sources for market and technology knowledge.

The findings of two first indicators: the percent of employees with higher education and importance of university education for future recruitment are presented in diagrams below. The companies that have half or more employees with higher education and those that evaluated the importance of university education for the recruitment higher than average (3 or higher) are grouped together for better comparison.

Diagram 1 The percent of employees with higher education in the companies.

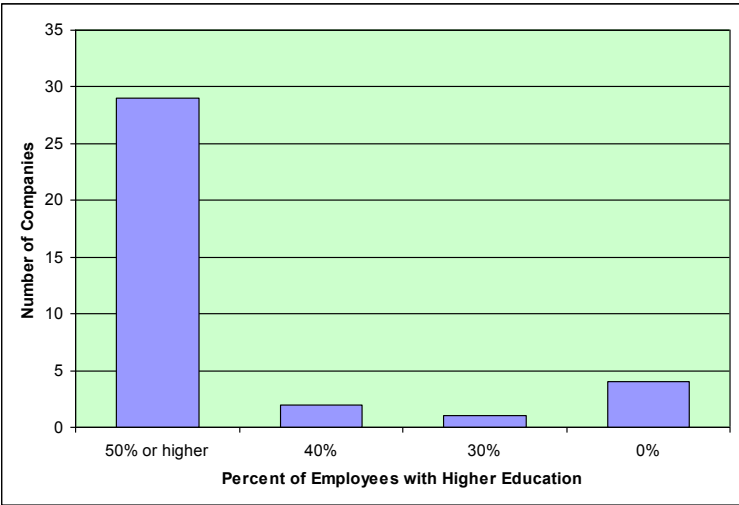
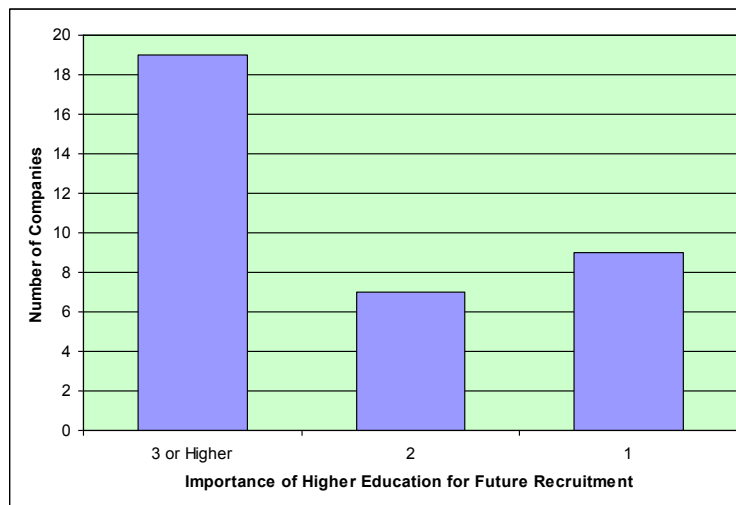


Diagram 2 The importance of higher education for recruitment of future employees.



The comparison of results shows that 19 firms evaluated the importance of university education for recruitment with the value of 3 or higher. But even in 29 companies the percent of employees with higher education is 50 or higher. It follows that even if companies' representatives do not necessarily require higher education from their (future) employees, it is more likely that educated person will be employed than the one without education. One more observation is that in all cases the most important factor for future employment is work experience in the same sector. It follows that university degree alone might be not enough to get employed, but it still a helpful characteristic.

Employment is one of the ways to transfer knowledge from university to the private sector. One of the technology companies' representative said that they are looking for students at university which hobbies or in other words passion for ICT could be turned into companies' business. The representative also valued the importance of inside knowledge from employees that are educated at university and brought the knowledge from academia to the company as 5.

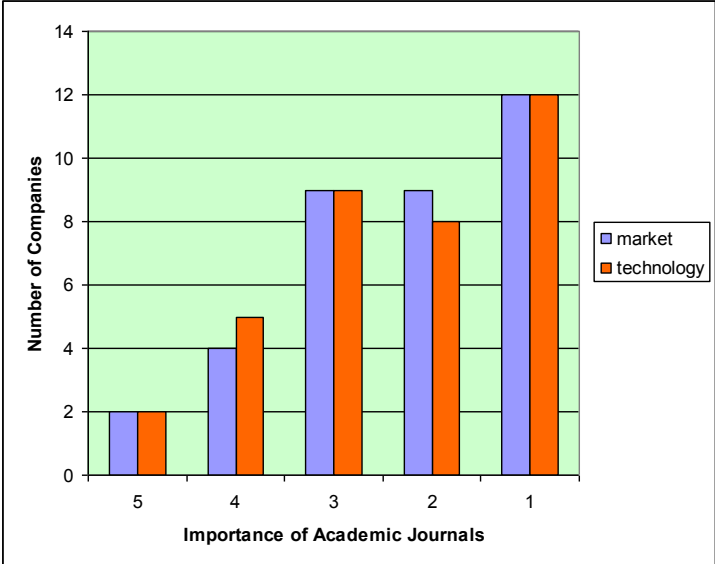
In other case the whole firm's idea is based on the technology that was initially created as phd project at university. Though none of these two firms mention university in

knowledge exchange list, it illustrates that universities are important generators of knowledge as well as pools for labor.

8 firms mentioned universities in the list of organizations they exchange knowledge about market and technology. 5 of them evaluated the knowledge as very important for the innovation performance (5 in 1-5 scale), 2 as important (3 in the scale) and one as a little important (2 in the scale). So if knowledge exchange with university exists, it is very important or important. In other case, it does not exist at all. An interesting observation is that from these 8 firms only 2 is technology based, meaning that artistic companies and universities might find the basis for collaboration.

Academic journals are more popular source of knowledge than direct collaboration with university. 26 companies use them as the sources for getting new knowledge.

Diagram 3 The importance of academic journals for innovation performance.



Academic journals are almost equally used as sources for technology and market, knowledge. The use of journals does not depend on the field of firm’s activity. Among those that do not use journals at all are both technology based and artistic firms. One of those two companies that evaluated journals as very important is engaged in film

production while other one in programming. It follows that academic research seems to be important despite the dominating knowledge base in the company.

The total value of relations with university for every company is presented in Table 1 in Appendix 3. One might argue that the value of relations with academia might be affected by size or age of the company. From 36 analyzed companies 17 were 5 years or younger at the time of interview while 18 were elder. After the comparison of the year the establishment and RUV, no clear conclusions can be made. For example, companies SE004 and SE031 are both established in 2007, both can be classified as very small, but the first one has the relations with university value 21, while the second one 8. Among the firms with the lowest RUV such as 3, 4, 7, there are companies that are 1, 11, 8 years old. The only trend that could be defined is that the firms SE004, SE005, SE018, SE021, SE027 and SE248 are the ones with the highest RUV (between 20 and 22). All of them, except SE021, were younger than 5 years at the time of the interview. It follows that there is a possibility that younger companies are more open to the idea of networking and are more willing to look for outside sources of knowledge. As it is seen from the examples, young company does not necessary is looking for relations with university, but if companies use more channels for getting knowledge from university and consider them of big importance, it is more likely that they are young ones. It can be explained by the fact that young companies are fighting for their survival in the market as they are exposed to high rate of mortality (Audretsch, 1995). In recent years the discourse of economical development based on cooperation, especially with universities, has been very active. It has also been emphasized that innovative firms have much bigger chance of survival (Cefis and Marsili, 2005). That's why some young companies may see developed relations with university as their way to establish themselves in the market. However, age cannot be the only characteristic for that.

The likelihood of survival is positively related to firm size (Audretsch, 1995). It follows that the smaller the company the lower the chance of survival. One might expect that small companies will be looking for relations with university in order to increase their innovativeness. However, the collected data do not suggest any links between firm's size and relations with university value.

The RUV is not affected by the dominating knowledge mode in the company. From 6 companies, mentioned above, with the highest RUV three are artistic and three are technology based. There are 2 companies that have the lowest RUV -3. One of them is artistic, the other technology based.

To summarize, I want to say that in the new media firms-university relations least developed activity is direct collaboration in knowledge exchange. More popular it is 'soft' exchange through academic journals. This trend can be explained. Direct collaboration requires commitment from both sides, should be based on clearly defined functions or projects, in many it involves financial responsibilities (a company is supposed to pay for academics' time). Journals provide overview of newest and most important research in academia, while does not require any commitment or specification from the company. The most intensive knowledge transfer takes place through employment when university educated employees use their experience in private firms. Relations with university do not seem to be affected by company's size; however there is some evidence that it might be influenced by firm's age. It is more likely that young companies will be developing relations with university in order to increase their innovativeness. RUV does not depend on the dominating knowledge mode in the firm. It follows that both – technology and artistic companies might find the background for collaboration with university.

Innovation performance

The innovation performance was measured using the following indicators: new products, processes, strategy, organizational structures, market concept; patents; turn over from radical or incremental innovations; time dedicated to the development of new products /services/ solutions.

Table 2 below summarizes the findings of introduced innovations.

Table 2. Introduced innovations.

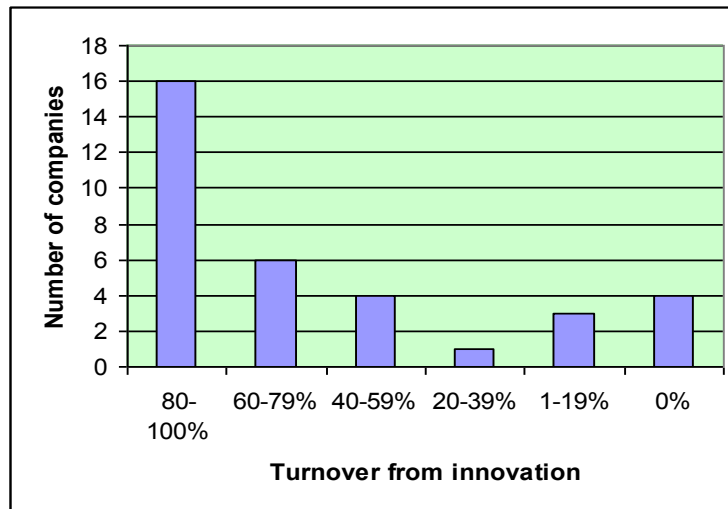
Innovation	Number of firms	The number of firms that also introduced new products
Products/services	28 (15 new to the market)	-
Made use of new production processes	25	21
Strategy	24	22
Organizational structures	20	17
Market concept	19	18

28 companies introduced new or significantly improved products or services on the market. 15 of them were new not only for firm, but for firm's market as well. It follows that in order to be competitive firms are trying both – to find the new niche in the market and copy or adjust already existing products. However, the first trend is dominating.

The findings suggest that different types of innovation within a firm are closely interrelated. The majority of firms that introduced new products also introduced new strategy, organizational structures or made use of new production processes. It follows that the innovation in other field (for example, new, improved material from supplier) affects firm's ability to innovate. The production of new products might require new strategy or organization. Improved market concept reveals the niche for new products. This idea will be further elaborated in the qualitative section of the analysis.

Turnover attributed to radical or incremental innovations is available from 34 firms. Diagram 3 below shows the distribution of companies according to the turnover.

Diagram 3. Turnover from innovations



Two of the companies with 0 turnovers did not introduce any new products while other two introduced only the ones which are new to the firm, but not to the market. It might be that their ability to innovate is not efficient enough and it affected turnover.

The percentage of turnover attributed to innovations depends not only on company's innovativeness, but on the age as well. The companies that get up to 20% of their turnover from innovations were established 1967, 1988 and 2000. Naturally, they have established products that the firm is based on and get the main profit. The last firm is not as old as other two. It specializes in engineering and in 8 years managed to introduce new technologies that are already the main stream and get the company 90% of the turnover. Nevertheless, all three companies introduced new products in the last 3 years and get some turnover from them. It follows, that all those firms' ability to innovate is not low, but hard to capture, using turnover indicator.

9 from 16 companies that get the major part of their turnover from innovations were younger than 4 years at the time of interview. It follows that almost all their products were new (either just for the company or for the market as well) at that time and naturally created high percent of turnover. Still even if those companies turnover indicator is 'unnaturally' high, it can be considered as an indicator for high innovativeness as the firms

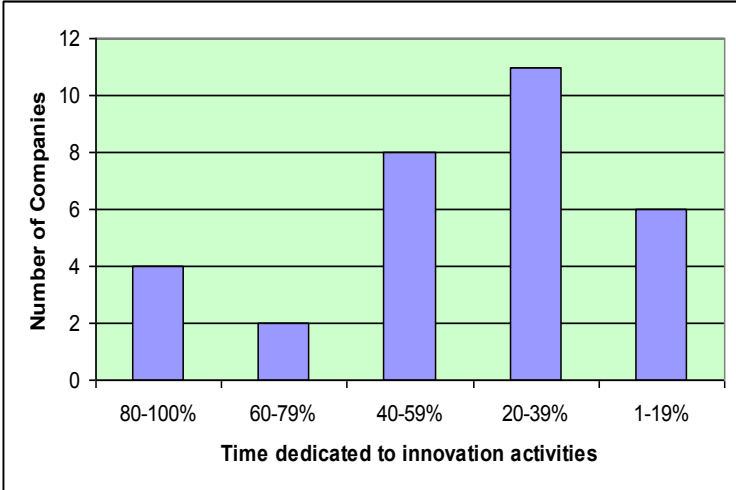
managed to get into the market, introduce their products and start getting profit in considerably short time (compare to young companies based on venture capital). In the rest of 7 cases high turnover indicator is definitely the sign of effective innovativeness. If elder than 4 years old companies have high turnover from new or improved products, it means that their former products were not profitable anymore and they were made to innovate in order to stay in the market.

In the rest of the cases the connection between turnover, year of establishment and introduced new products is not that clear. For example, company that gets 20% of the turnover from innovations was established in 2002. It did not introduce any radically new products/services in the last 3 years. The lower turnover indicator might refer to lower innovativeness, but it also might be affected by the fact that established products are profitable enough to contribute to the 80% of turnover.

Patent was applicable to 8 companies according to their field of activity and information achieved during interviews. One engineering company applies for 4-7 patents a year. One computer programming and consultancy applied for 5 patents and one for 3 in the last 3 years. One advertising company applied for 1. Patents can be related to innovativeness activities in the firm (limitations of this approach as well as justification for use were already discussed in the methodology part): the higher number of patents shows higher activity in innovation field. However, the absence of patents does not always mean the lack of innovativeness. From 4 companies that haven't applied for patents not even one explained it as the lack of ideas or patentable products. In two cases patent institution itself was questioned, saying that the firm believes in open source or that patenting takes too long time and it is better to keep business secret. In other two cases it was said that patents are not relevant to the company or are not included in firm's strategy.

Data about time dedicated to the development of new products /services/ solutions is available from 31 firms.

Diagram 4. Time dedicated to innovation activities.



Time is an important indicator showing firm’s investment into innovation activities. But running the firm requires more than just innovations, so it is natural that majority of the companies can dedicate less than 61% of their time. On the other hand, there does not seem to be any clear links between time dedicated for innovation and other innovativeness’ indicators such as introduced new products or turnover. It follows that it is not only time, but the efficiency of use of the time matters. However, time efficiency is a hard to measure quality and is not included in the innovativeness rate, but it is elaborated more in qualitative part of the thesis.

To sum up, I want to say that innovation performance is a very complex activity. That’s why innovativeness rate, based on the same indicators, can not be a completely objective measure. Every single firm has its own specific that might influence chosen indicators. Because of that, in some cases one or a few indicators are omitted in order to get as ‘fair’ innovativeness rate as possible. However, sometimes generalization approach is chosen, as it is necessary in order to have the system in the study.

Further on the finding of 4 qualitative cases are presented; discussing more detailed the relations with university and innovation performance.

Four Qualitative Case Studies

This part presents the case studies of four companies. They were chosen in order to represent different types of relations between RUV and innovativeness rate, as well as both dominations of knowledge bases. This analysis provides useful insights why the firms decide to develop (or not) relations with university and how the achieved knowledge is used (or not) in their innovation activities. There is approximately one year gap between the first structured and the second semi-structured interviews. In some cases the firm's networks and relations with universities developed in that year. Nevertheless, these changes were not taken into account while counting RUV and innovativeness rate, because innovation performance was influenced by firm's network at that time.

SE017 TAT – The Astonishing Tribe

This company was established in 2002. It had 150 employees in summer 2009. TAT is a Swedish software technology and design company offering products and services that differentiate and enhance the user experience of portable devices. TAT is headquartered in Malmö and has local offices in Korea and USA. The firm's motto is design loves technology and it bridges the typically problematic gap between designers and engineers⁸. Although the firm uses all three modes of knowledge creation in its daily activities, it is classified as the one with dominating analytical/synthetic knowledge base as it develops new technologies that can be applied for the creation of new media products. Company's RUV is 13 and innovativeness rate is 3.4.

⁸ Information available at www.tat.se

The Importance of University Links

University education is very important in company's activities as it gives the framework of abstract thinking. According to the firm's representative, people that work at the company and do not have university education have learnt 'by doing' how to solve problems. They are very good in unexpected situations. Educated people are better at abstract thinking that is very important for some aspects of innovation. For example, if one is creating software product that is going to live for a long time (longer than 6 months), it has to be done in a very structured way, because there will be a need to add things on the top of initial structure. University education in combination with work experience creates the required qualifications for such kind of tasks.

The study content or material the students study at universities are not of the big importance, according to the firm's CEO. But students have to do a lot of tasks that are abstract and that teaches them to think in an abstract way. This is the main benefit of university education.

As company works a lot with firms in other countries, TAT's CEO thinks culture should be taken into account that while discussing the way of doing things or thinking. According to him, Swedish are very disciplined and structured and together with UE it helps them to become very analytical.

Shortly, university education is not treated as the way to transfer knowledge from academia to the company, but rather as a place where required characteristics and skills in a broader sense are developed (e. g. structural, analytical, abstract thinking).

Knowledge is being transferred through collaboration with universities – mostly Lund University (LU) and Malmö Högskola (MH). At LU the firm collaborates with Faculty of Engineering: with working groups of Image analysis and Computer graphics. Firm's employees are guests-lecturers for one or two lectures at the faculty. Some students do their

thesis works at the company. Having the students enables TAT to test the ideas which commercial value is not clear. Lecturing helps to ‘zoom out’ what the company actually does and think about it in the abstract way.

The firm does joint research with MH, especially K3 – School of Arts and Communication (Faculty of Culture and Society). It includes the tasks from early brains storms to actual joint research projects. Students and professors participate in the project and the firm contributes with staff and codes. The firm is also a part of European program that is called “3D phones”. It includes other companies and universities.

Evaluating the importance, TAT’s CEO thinks, that in the long run, it is very important (4 from 5) to collaborate with universities for the innovation performance of the company; however, in short run it is of low importance. Companies are very revenue and application focus (everything what we do should be industrially applicable). Universities have academic highs, meaning that things are repliable on many different areas. University research solves more than just one problem; it solves abstract, general problems. Opposite to the companies universities have the possibilities to work with experimental things. These qualities are very important for innovation activities in the long run, but do not give any immediate outcomes.

Company’s CEO also found the books, written by academics, as a useful source of information, especially while creating the firm. Company is based on innovations in IT field. So some books were read in order to understand the nature of innovation. The respondent agrees that there might be ideas for innovations in academic journals, especially when it takes innovation inspired by other industry, but academic texts very seldom are inspiring. In comparison with journals books have more space for details and more chance for ‘fun’ reading.

To sum up, TAT treats university as an important partner in its everyday activities. University is a valuable source of knowledge, collaboration partner and pool for qualified labor.

Innovation Performance

According to TAT's CEO, a company locked in Ivory tower will not provide any innovations what so ever. There may be only random innovations that happen by mistake. External patterns are viewed and applied internally in innovation process. That is why the innovation in isolation is hardly possible.

Apart universities, the firm sees other three important sources of innovation. Firstly – customers. TAT sells not only products, but also provides different services such as TAT Academy and TAT Product support that involves high interaction with their customers. Through that interaction, the company collects lots of information about customer's needs and wishes. According to the respondent, innovations happen when customers make the firm do impossible. Additionally customers might misunderstand the product, assume that it has different applications. This makes the firm to think how to achieve those applications. Secondly – partners. TAT is a software technology company that specializes in visual presentations for mobile industry. But there are firms specialize in other factors, such as language. A customer would use all the parts to create the final products. Sometimes innovation sparkles when TAT looks how to bridge gaps between those different factors and tries to facilitate customer's innovation performance. The final way to innovate is to look at the totally other industry. In the case of this company it could be web industry. According to CEO, for example, what browsers do, might inspire some changes in company's activities.

The source of inspiration influences the way innovation is planned and introduced to the market. The innovations, demanded or inspired by the customers' needs

happen much faster as market demand and investments are very clear, while the ones inspired by other industries or partners are marked by uncertainty. In general the firm develops lean innovations; it tries to make sure that there is no waste of time and other resources. Employees responsible for engineering and the ones responsible for marketing work together when trying to define the problem, the product will solve. The rough product is tested with small amount of customers, and only after feedbacks and improvements the final product is licensed to the market.

Shortly, the company forms the whole network of universities, customers, partners and other firms in order to be innovative and produce profitable products.

The company is innovating in the field of products, organizational structures and business model. According to the CEO, in some cases these processes might be interrelated. For example, at the time of the interview the firm was involved in the process how from targeting very few companies (5-10) to start targeting 500 companies in 2 years. That changes the product, the organization (much more staff is needed and its accountabilities must be rethought), and business model (the amount one can charge for the service/product is changing).

There have always been a lot of innovations in all three areas. Least part that is changing is organization. Some people maybe do not have strict instructions what they have to do. They can do what they think it is right and that creates some organizational innovations. On the other hand, products are continuously innovated. Business models are in a shift in the whole world, at least in digital industries. It must be rethought how to charge the customer, as digital content is free to reproduce, but costly to develop. So it is a big shift in business model how to make people pay.

To sum up, the company understands innovation in a broad sense as new products, organizational structures and business model. It uses the whole range of different external sources in order to get the knowledge that can be applied internally.

SE005 Do-fi

The company Do-fi was established in 2006. It had 3 full-time and 2 part time employees in summer 2009. The company's motto is visualizing interaction. The competence of the company is a combination of innovative technology-based concept development, interaction design and programming⁹. The company is classified as technology based as it develops new technological solutions. The firm's RUV is 21, while innovativeness rate is 2.7.

The Importance of University Links

The company evaluated the university education as very important characteristic for recruitment. According to company's CEO, it is not possible to work in the company without proper education. It provides the needed knowledge for the activities.

The company collaborated with 2 universities at the time of the interview and intended to collaborate with 2 more in the nearest future. The company has joint projects with academia. As there is a number of policy initiatives supporting academia-industry collaboration, university and the firm apply for the project support together and that increases the chance of getting the financing.

Students also write their thesis in the company. That way the company tests its new products. One of the joint projects examples is the development of hardware. The company created hardware. The university made field research, provided the possibility for the company to test the prototypes and came with the suggestions how to improve it.

⁹ Information available at www.do-fi.se

According to CEO of the company, this way the firm benefits from university knowledge while university can work with real business case, not only abstract theories. This practical aspect is very important in students' education. It follows that through the collaboration both sides get needed finance and exchange knowledge.

Abstract knowledge that is developed at academia might also be beneficial for the company in the long run. University develops terms, ideas, while company can get insights from that and start creating products, looking for commercial application of some parts of abstract knowledge. Academic journals are one of the channels to get that abstract knowledge. The founder of the company was researching academic journals to get the information about what is happening in the field of their activity and on what the company should be based. Additionally, some articles provide statistics on how technology is actually used – how many people and in what ways use one or other item. That information is important in negotiations with clients, market understanding.

The knowledge exchange also takes place through informal channels, personal contacts.

The firm has not only technology projects, but also social responsibility charity projects with university. They developed a small charity organization which updates used laptops and donates them to African countries.

To sum up, the firm has highly developed relations with university, including joint research, thesis writing, use of academic journals and social projects. This knowledge influences company's product, adopted processes and market understanding.

Innovation Performance

The innovation might be inspired by the process happening outside the company. According to the CEO, the firm might be inspired by competitors and their

inventions. The other source of innovation is customers. They come with some idea or need, which the firm improves and new product is introduced. The final user of the product, the way the product is used, offers the ways for further improvements. As it was already mentioned, innovation performance is also affected by university. University representatives offer new ideas for products and improvements for prototypes.

The firm mostly understands innovation as product innovation. It is very effective in product innovation field. At the moment of the interview 4 different product projects were run in the firm with only 3 full-time and 2 part time employees. As the company is so small, there is no clearly defined organization structure, that's why it is hard to define any changes within it. Similarly, the changes in strategy or market concept are not articulated and defined.

The firm has high RUV, but medium innovativeness rate. IR is affected by the fact that firm does not introduce, or do not think they introduce other than product and process innovations. But it must be stressed that it is very innovative and active in product creation.

SE031 Mindpark

The company Mindpark was established in 2007. It had 4 full-time employees in summer 2009. Mindpark is a web developing agency with the Swedish morning newspaper industry as its main clients and beneficiaries. The purpose of the company is to define and implement projects and business opportunities in new/digital media. Mindpark ensures innovation and profit for its owners by being dedicated to web based production¹⁰. The company is classified as artistic based as it does not produce new technology, but rather creates new values using ICT opportunities. The company's RUV is 8, while innovativeness rate is 4.6.

¹⁰ Information available at www.mindpark.se

The Importance of University Links

The company does not collaborate with university in a formal way. There are no common projects or joint ventures with academia. According to company's CEO, this is not a conscious decision; there might be such projects in the future, although it has not happened yet. One of the reasons is the difference in speed. The university-run projects take too long time compare to the projects at the company that last for 3 months at the longest. On the other hand, some employees within the company or the people the company works with are based in university world or at least have a heritage from university, such as university education.

There are a lot of activities at MH, surrounding new media industry. The company has contacts with the people, working there or takes part in some of the activities. Some people are employed for the projects at the company and also work for MH's projects. The firm is a part of some policy initiatives such as Moving Media Southern Sweden. So company's employees and university staff meet at different events and conferences. The firm does not have any students' internships right now. However, it would be interested in having interns. But it should be hard working and creative students that come with their own ideas to the company and there together with company's help might realize them.

New media has some different foundations – one is technology, other is culture, social approach. According to the CEO, from technological approach LU could be an attractive partner. But the social and cultural approach is more attractive at MH. That's why so far the firm has contacts only with MH. On the other hand, company is not closing any doors. If LU has any interesting project, the company would be happy to be part of it.

While recruiting new staff, university education is never an important factor as such. But of course, it might be that the needed characteristic an employee inherited from being a university student or having a history at university. On the other hand, an employee might have needed characteristics without having specific education. The most important

characteristics, according to the CEO, are creative, hard working, boundless mind. The other aspect is qualification. It does not have to be formal experience, but there should be a prove that a person lives in the world the company aims at, the digital, new and social media world.

To sum up, there is no formal links between academia and Mindpark, but it seems that there might be quite intensive flow of knowledge through personal connections, the personnel, working for both – academia and the company, conferences and other events.

Innovation Performance

The company has introduced new products, strategies and organizational structures in the past couple of years. According to the CEO, these processes are closely interrelated in most of the cases. Actually, to connect all these parts – new products, organization, strategy – is treated as the main challenge working with old media, where traditionally all the parts have been separated. Products, strategies and organizational structures are so closely related in new media industry that it is almost impossible to draw the line and separate one from another. However, it also might be that one leads to another. According to the CEO, one can enter the problem from organization or technological need and that changes the rest of the aspects. Especially, the technological innovations have snowball effect. It creates new possibilities and forces the changes in strategies and organizational structures.

According to the CEO, new ideas are not much initiated by external partners, as much as they are implemented and turned to reality by help of external partners. The ideas for innovations come from existing problems that must be solved. Company's CEO gives an example of ads serving. The firm realized that existing solutions were too expensive and not good enough. Then the company looked at the market for some possible solutions to the problem. There was no commercial partner in Sweden that could deliver something that was

better than already existing product. Then the company looked in open source, “Google” and found the solution that was excellent, free and enabled media companies to make twice much more money than before. That was done in about 3 weeks – from identifying the problem till having the solution ready to be implemented.

The company is influenced by suppliers in such cases when they develop some new technology and the company uses it in a way the inventors even did not expect. So the innovation comes from inside but it would not be possible if suppliers first of all did not develop the technology itself.

On the other hand, the other firms, working in the same field, are treated with a high importance. According to the CEO, the network that Mindpark has evolved has definitely been beneficial for getting information about what it is going on and what the trends are in new media field. The company thinks it is very important to continue developing that network. That does not mean formal networking, but rather getting and developing personal connections. The firm sponsored the event “24 Hours Business Camp” where 100 new media developers met for three days and in the middle they were creating things together for 24 hours. The other event is Stockholm’s social media lunch that in 2 years has developed from 7 to 170 participants from new media sector. These events help to develop informal network. The communications with other companies in new media industry is very important for the innovation performance.

To sum up, Mindpark is a very innovative company, introducing many different innovations and treating them as interrelated processes. Similarly, like in the case of university, it does not seem to have many official partnerships. However, the firm is actively developing the network being a sponsor or participating (investing time and human resources) in events, dedicated for new media companies. This communication and informal networking has a big impact on company’s innovation performance.

SE001 Anagram Produktion

The company Anagram Produktion was established in 2003. It had 9 full-time employees in summer 2009. The company is involved in film and scene shows production. The firm is classified as artistic based. Its RUV is 10 and innovativeness rate is 3.9.

The Importance of University Links

The university education is not regarded of a high importance in the company. First of all, a person should have good knowledge about the business and work experience. However, if a person does not have work experience s/he could be employed because of a proper academic degree. According to company's CEO, a person could be employed if s/he has some business or law degree and studied in film studies as well. The business side of film production is underdeveloped. That's why this combination could weight out the lack of work experience.

The company started to collaborate more actively with LU in the last year. The firm's CEO consulted university's representatives in the creation of master programme in film and media production. He also participates in it as a guest lecturer. The firm and university have joint projects. E. g., Lund Film Academy is the result of collaboration among Lund University, Film i Skåne, Anagram Production and Lund's municipality. It has been addressed partly to students at the film and media production programme, partly to local and regional film makers as competence development, and partly to national and international film makers.

According to the company's CEO, the company not only gives its practical knowledge to academia, but also benefits from this collaboration. First, it has the primarily access to best film students and graduates. Second, the academic sight broadens firm's knowledge and interface about film business and market.

The company mentioned the academic journals as source of knowledge in the previous interview. However, in daily work they are not used very often, and mostly for the purpose of general orientation.

To sum up, the company's main channels for knowledge exchange with university are joint projects and share of staff (teaching). This is quite new experience that seems to awaken firm's interest and trust in academic knowledge. The importance of access to film students (that was mentioned by CEO) shows that it is very possible that in the future employees with university education will become a part of firm's knowledge landscape. The teaching at university might also lead to increased use of academic journals.

Innovation Performance

The company has introduced many types of innovations in the last couple of years, such as product, process, organizational structures, business model and market concept. According to the CEO, all these processes are interrelated – change in the one part influences the other. In the recent years the company has changed its business model, meaning that together with creative aspects, business and market factors should be taken into account. The product should be able to exist on market's conditions. Naturally, this changes market concept, products, and processes.

Innovation is often inspired by other companies in the field. According to the CEO, in movie industry in Sweden everyone knows each other quite well. There is a lot of informal communication. This way the processes adopted by one company are transferred to another.

Ideas for new films might sparkle from inside or outside. The whole process in creating a movie includes lots of outside partners. One of the newest projects – the feature film was offered by outside director who came with an interesting script. The financing

application included the firm, outside director and script's author. When the financing is achieved the hiring of personnel, actually needed for that film, subcontracting of various activities, starts. The whole process from the idea to the movie in the market takes about 2.5 years.

To sum up, the company is quite innovative, introducing different types of interrelated innovations. Its innovation process is highly affected by outside partners – for both inspiring and actually creating new products and adopting new processes. Collaboration with university is a new experience, that's why it is hard to measure the influence. However, the introduction of such new projects as Lund Film Academy shows that this collaboration affects firm's innovativeness in a positive way.

Summary of Four Cases

Four selected companies represented different knowledge base and different links between innovativeness and relations with university. Both companies with symbolic knowledge base had medium (but close to low) RUV, but high innovativeness rate. One of technology based companies had high RUV, but medium innovativeness rate, while the other one had medium RUV and medium innovativeness rate. At first glance, it could have confirmed the hypothesis, that in the firms with dominating symbolic knowledge base relations with university do not affect the innovation performance. It also creates a puzzle as technology based company had quite low innovation performance despite well developed relations with university. However, it seems that structured questionnaire failed to capture all the aspects of innovation performance, as well as some activities with universities.

Anagram Production had the orientation towards the establishing links with university, which resulted in quite intense collaboration later. Possibly this company was more open to academic ideas already during the first interview, but the questions could not

fully reveal that. Mindpark participated in university culture, events, has had shared personnel with university. But these aspects were not captured by the questionnaire as respondent did not treat this as an important source of knowledge and did not include it in any answers. Similarly, Do-fi is very innovative in one area (product innovation), but other aspects such as organization structures or market concept have not been relevant in this case. The intensity of innovativeness in one or other area has not been captured by the questionnaire as well. That is why it was beneficial to conduct those interviews for deeper insights. It suggests the insight that technology based company with well developed relations with university actually is very innovative (at least in product innovations) and that is affected by university's knowledge. In the case of artistic companies relations with university might be more important that it might have seemed at first glance or was captured by the questionnaire. The following part develops the idea of relations with university on innovation performance further by relating quantitative and qualitative findings.

University's Influence on Innovativeness Rate

Semi-structured qualitative interviews reveal that new media firms and universities are involved in different types of common activities. First, university is pool for labor. One company considers that university knowledge is essential characteristic for future employment, other thinks that it provides more general abstract framework. In the third case even if university education is not a conscious requirement while recruiting, it seems that the applicants with university education are more likely to have required characteristics when the ones without it. In the fourth case it is admitted that a proper university degree might replace work experience. Technology based firms formulates university education as a requirement for their employees while artistic based tend to look for more practical, although not necessarily formal, characteristics. However, even in film production company, the

importance of higher education seems to grow in the future. Secondly, universities help companies to develop new technologies. But even in those cases knowledge exchange cannot be labeled as technology exchange. The technology is not transferred from university to company, but rather created in a joint research groups. Moreover, some of the joint projects such as Lund Film Academy, is not based on technology or research, but provides the framework for competence developing activities in different levels. Guest lecturing and thesis writing provides students with practical experience, while enables the companies to get fresh ideas and evaluate their work. Universities contribute to social and cultural approach of new media through informal contacts, joint events and personnel working at both sides. Books and articles written by academics provide general orientation within the field and might add to better market understanding. Both technology based companies together with informal relations have more formally defined collaboration activities while in the case of artistic firms, one mostly depend on non-formal communication aspects, while the other is mostly involved in formal cooperation.

All the companies consider their innovation activities highly affected by the outside's processes. Together with university, innovation is affected by customers, actual users, competitors, and other actors. None of the companies imagine that innovative activity might be possible without communication with others, in isolation.

The trends that could be indicated from structured interviews with 36 companies offer similar insights. There are 8 companies that have low RUV (here and further for detailed data look at the Appendix 3). 4 of them have low and 4 medium innovativeness. None managed to achieve high innovativeness. Companies with symbolic knowledge base are dominating in this group. (Only one SE026 is technology based.) Contrary to what was expected, badly developed relations with academia seem to have an effect on artistic

companies' innovativeness. 4 companies (from 5) with the lowest innovativeness, are artistic ones and belong to low RUV group.

There are 8 companies with high RUV. Among them 3 have high innovativeness and the rest have medium innovativeness. It follows that if a firm has well developed relations with university it reaches at least medium innovativeness.

SE005, SE018 and SE027 are technology based companies and the rest ones are artistic. One has high and the two other ones medium innovativeness. In the group of firms with dominating symbolic knowledge mode the ones with the most developed relations with university (value 21) are not the most innovative (3; 3.3). Still university has a positive affect on artistic companies, as all the firms in this group have reached at least medium innovativeness.

The rest 20 firms have medium relations with university value. Among the firms with medium RUV there is only one that has low innovativeness. 6 ones have achieved high innovativeness while 12 have medium rate. All companies that managed to achieve high innovativeness are the ones with symbolic knowledge mode. 4 technologic companies SE019, SE015, SE017 and SE350 have medium innovativeness rate.

To sum up, university's knowledge has a positive effect on firms' innovativeness. The companies with undeveloped relations with academia were not able to reach high innovativeness. On the other hand, all the companies that are using intensively university knowledge have achieved at least medium innovativeness. Among the firms with medium RUV, only one had low innovativeness and that was the highest rate from low group (2).

The effect of dominating knowledge mode in the company seems to be very small. Among the companies with the combination of analytic and synthetic knowledge mode, the firm with the highest RUV has the maximum innovativeness rate. All the firms

with medium RUV have medium innovativeness. But on the other hand, SE026 has low relations with university value, but 3.4 innovativeness rate. While SE018 has high relations with university value and 3.5 (almost the same) innovativeness rate. So the first part of hypothesis that the rate of innovativeness will be higher in the companies with dominating analytical and synthetic knowledge base if they collaborate with university cannot be confirmed. University has a positive effect, but it is not a crucial condition.

Among the companies with symbolic knowledge mode the ones with the highest RUV have only medium innovativeness. One of the companies with highest innovativeness (4.9) has high RUV (20), while the other one (innovativeness rate 5) has medium RUV (13). On the other hand, 4 companies with lowest innovativeness rate have low RUV and at least average RUV is needed in order to reach high innovativeness. It follows that the second part of hypothesis claiming that in firms with dominating symbolic knowledge base university won't affect the rate of innovativeness is not correct. That is also supported by the results from four case studies, as it was mentioned above.

Innovation performance is a very complex activity and relations with university alone cannot explain all its aspects. That's why in some cases the firms could have had high innovativeness rate even if their RUV was medium. On the other hand, in this study 'relations with university' value becomes higher if the firm uses more channels for getting knowledge from university (employment, direct collaboration, academic journals). But the number of channels does not always mean that the knowledge was absorbed and used efficiently. That's why in some cases it might have been that a few companies whose RUV is high have medium innovativeness rate. Moreover, the innovativeness rate was growing if the company introduced different types of innovations (organizational, product, process, business model). But the questionnaire did not capture the intensity of each type (e. g., how many products). So

the companies with high intensity in one of the fields might have got lower innovativeness rate, even if they are very innovative.

The analysis shows that there is a general trend for the innovativeness to grow when the value of 'relations with university' is growing and really high innovativeness is not possible without academia's involvement in a form of 'hard' or 'soft' knowledge transfer. Opposite to what was expected it does not seem to be affected much by the knowledge mode or specific of the company.

The four cases interviews reveal that university-industry collaboration in new media field goes beyond the knowledge exchange and attempts to turn into the creative environment. The firms and universities support each other in finance application, exchange knowledge and collaborate in social responsibility initiatives, such as charity programmes.

Discussion, Conclusions and Recommendations

The aim of this thesis is to analyze how (if at all) relations with academia affect the innovativeness of new media firms. The data from structured interviews with 36 new media companies in Skåne and from semi-structured interviews in four in-depth cases studies were analyzed using the combination of qualitative and quantitative approaches. These approaches enabled to detect the trends within the sector and provide some explanations for that. The Open Innovation paradigm and the framework of university-industry knowledge transfer have been chosen as theoretical guidelines for the discussion.

Relations with University and Knowledge Transfer

Following the knowledge transfer literature, I have argued that developing the channels with academia is conscious, investment requiring procedure. The companies use different types of knowledge transfer channels in order to get the knowledge from academia.

The most popular channel seems to be employment of the personnel with higher education. In 29 (from 36) companies the percent of employees with higher education is 50 or higher. As it was revealed in qualitative interviews, in some of the cases the personnel with higher education might be hired because of the knowledge (e. g. knowledge content) itself s/he achieved in academia (Do-Fi, Anagrama production). In other cases, an employee with higher education is not treated as the holder of university research information, but rather as the one with developed needed skills for innovation performance (such as abstract, analytical thinking in the case of TAT). Similarly, the fact there are personnel working for both – company's and university's projects came out to be a rather a coincidence than a conscious decision by the company to use university knowledge. However, company's CEO admitted that it might that the person has required characteristics because of the relations with university. So the university first of all is not the holder or developer of new technology, but the pool of labor with specific skills.

The second popular channel is the use of academic journals in search of new knowledge, used by 26 companies from the sample. This is time and human resources requiring channel. Academic journals provide some general orientation within the field and also improve the understanding of market and technology use. An interesting finding is that TAT that does not use this channel as it is too little inspiring, and time consuming, still uses the books, written by academics as the sources of ideas for innovations. It follows companies build on the ideas, inspired by publications, in their own business as it is offered by the Open Innovation paradigm. For example, the founders of TAT read the books with a goal to understand the engine behind innovation process. The books seem more attractive because they have more details and are more fun to read. It follows that some 'popular' science magazines could be the way of transferring the knowledge to the industry.

Least popular seem to be ‘hard’ knowledge transfer through direct collaboration. This includes joint or contract research, students’ internships (thesis), staff share. Johansson et. al. (2005), discussing ‘moral’ values of university-industry relations highlighted the importance of mutual exchange of knowledge that means the ability to learn from each other. That seems to be the case in ‘hard’ knowledge transfer activities. First of all, none of the interviewed companies have contract research with university; it is joint research that prevails. Joint research in itself is already the exchange of knowledge and learning from each other. Discussing students’ internships or thesis works at the company, firms’ representatives see the exchange of knowledge as the main contribution of these activities. Students might implement their ideas with help of company’s experience or the company tests their idea’s commercial value with the help of students’ research. Staff share, in the case of lecturing at university like in TAT or Anagram production, is also treated by the company first of all, as the ability to check what the company is actually doing, getting the feedback, learning by teaching. At the same time, by teaching they transfer some of the experience to university’s students and researchers. Companies and academia exchange knowledge in joint projects that do not include joint research (in its narrow R&D meaning). The charity project, introduced by Do-Fi together with university, improves the ability of being social responsible for both organizations. Lund Film Academy, introduced by Anagram Production, LU and other partners, offers the framework for competence building. It follows that ‘joint project’ is a more proper name for knowledge transfer channel in the field of cultural industries studies, as it involved broader spectrum of joint activities.

Some qualitative cases (e. g. Mindpark) revealed that in ‘hard’ knowledge transfer, very right seemed to be Asheim et. al. (2006) saying that public sector (especially universities) should take more active role in collaboration with industry. As the company does

not feel the necessity to look for joint research with the university or start students' internships, but it would be interested if the university or student came with an offer.

The questionnaire, prepared by the coordinators of the project, did not include such channels as conferences or other events as the ways for getting university knowledge, as it aimed to collect the information about networking in general, rather than about universities specifically. The qualitative cases reveal that conferences and other events are the places where new media industry and academia meet. So it might be an important channel where university knowledge is transferred.

Summing up the use of channels, one might agree with Cohen et. al. (2002) that the most important channels are relatively decentralized in the sense that they do not typically reflect formal institutional links and are also not mediated through any sort of market exchange. But it also proves the arguments of many authors that university knowledge is far from costless. The firms have to invest time, human and sometimes financial resources in order to exchange the knowledge with academia.

The discussions with companies' representatives brought into the attention the importance of applied and basic research at universities. As it was said at the introduction of the thesis, the pressure from the politicians for universities to concentrate onto applied research is very big, as it is often treated as the only way to fulfill the economic responsibility. This attitude is also hold by some companies. E. g. Mindpark's CEO said they do not have joint research with universities because of the too big difference of the specifics of the projects or what I, following Johansson et. al. (2005), would name as too big difference in language and symbols. On the other hand, the group of researchers, as it was mentioned above, raised the concerns of the disruption of scientific values, including the diminishing of the basic research at universities. It seems that this concerns industry as well. TAT sees university as an attractive partner because of the experimental, more general research, which

contributes to the company's innovation performance in the long run. It follows that in order to sustain the innovativeness of the industry politicians and universities should find the compromise between basic and applied research in academia in the future.

Innovation Performance and Open Innovation

Following Schumpeter in this thesis innovation is understood as new products, new methods of production, new sources of supply, the exploitation of new markets, and new ways to organize business (Fagerberg, 2005). The quantitative analysis revealed that the most popular among the companies is product innovations, proving Davis et. al. (2009) findings that creative cluster is focused first of all on content and product innovation. However, the majority of firms that introduced new products also introduced new strategy, organizational structures or made use of new production processes. The qualitative interviews with companies' representative supported the idea that innovation processes are closely interrelated; meaning that it is hard to draw the lines among product, strategy and business model (e. g. interview with Mindpark) or an innovation in one field (most often technology, that is so typical for creative industries) has a 'snowball' effect and influences the rest of the processes. On the other hand, as it was noticed by TAT's CEO, product innovation is in a continuum shift, while other fields might be less changing.

Following the idea of open innovation, I have argued that all company's innovation activities can be treated as an open system. The representatives of all four companies that were chosen for qualitative analysis confirmed that external knowledge and networking is a very important factor, influencing their innovation performance. Some of the companies like TAT and Do-fi might use more external channels (customers, partners, other industries, competitors and universities), others might concentrate mostly on the companies working in the same field and partly universities (e. g. Mindpark), but they all admit, that

without communication with others innovation is almost impossible. It should also be stressed that it is not only product innovation the companies are having in mind. Innovations in marketing areas, such as business models, are highly influenced by the shifts happening outside the company. Additionally, companies (e. g. Do-fi) collaborate with academia in social responsibility – charity projects. It changes the dominating understanding of both – innovation (as it leads to innovation in social responsibility field) and collaboration (as it goes beyond technology transfer or even knowledge exchange in a narrow sense).

To sum up, the innovation activities are becoming an open system in new media field. Despite of the dominating knowledge base or specific of the company, communication is seen as a very important aspect of innovation activities. It leads to interrelated processes of different types of innovations within the company as well as the intensive use of external knowledge sources. This openness in collaboration with other actors leads even in innovations in company's social responsibility field.

The Relations with University Effect on the Innovativeness

As it was mentioned above, new media is a very diverse sector where some of the companies develop new ICT technologies, while others adopt those technologies for artistic and marketing reasons. Taking this into account, I have raised the hypothesis that the rate of innovativeness will be higher in the companies with dominating analytical and synthetic knowledge base (technology based) if they collaborate with university, while in firms with dominating symbolic knowledge base (artistic ones) university won't affect the rate of innovativeness.

The analysis reveals that there is a general trend for the innovativeness to grow when the value of 'relations with university' is growing and really high innovativeness is not possible without academia's involvement in a form of 'hard' or 'soft' knowledge transfer. The

effect of dominating knowledge mode in the company seems to be very small. As it was seen in the analysis section above among the companies with dominating analytic/synthetic knowledge base some had almost the same innovativeness rate, but quite big differences in relations with university values. Among the companies with symbolic knowledge mode at least average RUV was needed in order to reach high innovativeness. Both companies with symbolic knowledge base from the four cases studies had some contacts with academia and the knowledge flow seemed to have an effect on their innovation activities.

The hypothesis cannot be confirmed because it overestimates the importance of university knowledge in technology based firms and underestimates in the ones with dominating symbolic knowledge base. Using Cohen's et. al. (2002) terminology, the conclusion can be made that although there are a few companies where university knowledge seems to play very important role, in most cases relations with university is 'moderately important' for the innovation performance of new media companies, despite of their activities.

Despite of the number of limitations of the thesis (which are discussed below), it reveals that majority of the new media companies operates or goes towards the Open Innovation paradigm. Openness, networking, and the use of external knowledge seem to be an important factor leading to innovative activities and together to successful performance in the market. Qualitative analysis shows that while the companies might have more or less formal links with universities, all of them see it as an important actor in their knowledge exchange network. The relations with academia not only provide access to university knowledge or help to develop new technology, but increase the chance for getting financing (essential input for innovation activities) as existing policies tend to support academia-industry partnership and lead to the changes in company's social responsibility activities. The Open Innovation paradigm, promoting openness and share of knowledge has the chance to reduce industry-academia tension, as open science and open business model have much in common. This

study also reveals that university's collaboration with industry does not have to be limited only on technology transfer. The departments involved in humanities, culture, art, design areas can become good partners for creative industries and foster the innovativeness in those fields.

Limitations and Future Research

This thesis is an initial study, analyzing the links between university and creative industry, in industry-academia relations literature. Naturally, it has a number of limitations and opens many possible paths for future research. First of all, a larger sample of firms and more even distribution between technology based and artistic companies is needed for quantitative analysis in order to get statistically representative results, as well as more indicators, measuring relations with university or innovation performance. Cultural aspects and traditions might influence the results. That's why an international comparative analysis could be an interesting choice.

The relations with university might affect the company in a long run, but do not have an instant effect. So it might be useful to analyze how academia affects the innovativeness rate, using different time layers. Additionally, when firms talk about innovation performance, they do not talk just about university, but rather about the network of different actors. The detailed study, evaluating the importance for innovation performance of every actor, could provide some useful insights in the research field.

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Appendix 1

The questionnaire for the structured interviews*

General Information:

All information is treated confidentially, i.e. it will not be possible for anyone to identify your firm and name. Moreover, no individual firm or organization will be mentioned in any publications based on these interviews. If such a need should arise, we will contact you again and ask for permission. If you then say no, we will respect that.

Date of interview:

Name of firm:

Firm number (anonymous):

Address of firm:

Name of respondent:

Function of the respondent:

- Entrepreneur
- head of technical department / R&D department
- head of commercial / marketing department
- other, please specify

* The questionnaire was constructed by the coordinators of the project 'Constructing regional advantage: towards state-of-art regional innovation system policies in Europe'. The questions that were relevant for the purpose of this thesis are marked in bold.

Part 1: Introduction

- 1.) **In what year was your firm established? In case of merger or acquisition, indicate also the year in which the most recent merger or acquisition took place.**
- 2.) Is your firm owned by another organisation?
 - a. Yes
Is this relevant in daily business and for choosing cooperation partners?
 - 1.) Yes
 - 2.) No
- 3.) Has your firm always been located in ...?
 - a. Yes
 - b. No
 - 1.) Where was it located before?
 - 2.) When did your firm move to.. ?
- 4.) **Could you please indicate how many employees (full-time equivalents) are working in your firm? What was this number 3 years ago? ...**
- 5.) What are the main activities for achieving competitiveness of your firm (multiple selections possible)?
 - a. Production of tailor made products / processes for individual customers
 - b. Production of standardised products / processes
 - c. Product/process development
 - d. Design
 - e. Marketing
 - f. Other...
- 6.) **What is the educational level of the employees? Please indicate the share (%) of the following (adding up to 100%):**
 - a. **Bachelor's degree or higher: %**
 - b. **Lower than Bachelors' degree: %**
- 7.) What is the educational background of the employees? Please indicate the share (%) of the following disciplines (adding up to 100%):
 - a. Beta-sciences
 - b. Technical studies like engineering
 - c. Artistic studies like arts, media etc.
 - d. Other
- 8.) Please indicate in terms of percentage (adding to 100 percent) the relative importance of:
 - a. knowledge sources inside the company
 - b. knowledge sources outside the company
- 9.) **Please indicate from which of the following organizations you recruit your highly skilled employees. Please indicate their relative importance from 1 (not important) to 5 (very important).**
 - a. **Universities (importance 1..5)**

- b. Technical Institutes (importance 1..5)
- c. Firms (same sector) (importance 1..5)
- d. Firms (other sectors) (importance 1..5)

10.) Please indicate from which of the following three spatial levels (regional, national, international) you recruit your highly skilled employees. Please indicate their relative importance from 1 (not important) to 5 (very important):

	Regional	National	International
Universities	1..5	1..5	1..5
Technical Institutes	1...5	1...5	1...5
Firms (same branch)	1...5	1...5	1...5
Firms (other branches)	1...5	1...5	1...5

- 11.) If firms from other sectors are mentioned (9d), please name the three most important sectors you recruit from. Indicate their importance from 1 (relative low) to 5 (relative high). *(If possible, the interviewer should make use of three digit NACE codes)*
- a. Sector: ... (1 ... 5)
 - b. Sector: ... (1 ... 5)
 - c. Sector: ... (1 ... 5)

Part 2A: Knowledge Exchange – Market Knowledge

This part of the interview deals with the exchange of market knowledge, e.g. knowledge concerning new developments, market trends, market development, etc.

- 12.) **Please name all organizations your firm is in contact with and exchanges market information for your innovation activities. These may be firms, universities, research organizations, public agencies etc., and no matter whether these are local or non-local organizations.** (For the purpose of the thesis it is important is any university is mentioned).
- 13.) **Could you provide for each of the organizations mentioned in question 12 the following information:** (the question is relevant only if university was mentioned in answer to question 12)
- a. The type of organization. For firms specify whether they are suppliers, customers, competitors, other companies.
 - b. Please indicate the location (municipality) of each organization you mentioned.

- c. **Please indicate for each organization from 1-5 how important this relation is for your firm's innovation performance (1 not important to 5 very important).**
- d. Please mention for each organization in which sector it is mainly active.
(Interviewer: use three-digit NACE codes if possible)
- e. Please mention for each organization whether the market knowledge in your firm is similar to that of the organization mentioned. (1 not similar to 5 very similar)

14.) Could you express from 1 to 5 the importance of the following sources of information for gathering market knowledge?

- a. Fairs and exhibitions
- b. Specialised magazines
- c. Market surveys
- d. Academic journals**
- e. Are there any other sources of market knowledge that are not mentioned above?

Part 2B: Knowledge Exchange – Technological Knowledge

This part of the interview deals with the exchange of technological knowledge required as input in production, new product/process development, and technological improvements.

- 15.) **Please name all organizations your firm is in contact with and exchanges technological information for your innovation activities. These may be firms, universities, research organizations, public agencies etc., and no matter whether these are local or non-local organizations.** (For the purpose of the thesis it is important is any university is mentioned).
- 16.) **Could you provide for each of the organizations mentioned in question 15 the following information:** (the question is relevant only if university was mentioned in answer to question 15)
- a. Please indicate the name and the type of organization. For firms specify whether they are suppliers, customers, competitors, other companies.
 - b. Please indicate the location (municipality) of each organization you mentioned.
 - c. **Please indicate for each organization from 1-5 how important this relation is for your firm's innovation performance (1 not important to 5 very important).**
 - d. Please mention for each organization in which sector it is mainly active.
(*Interviewer: use three-digit NACE codes if possible*)
 - e. Please mention for each organization whether the technological knowledge in your firm is similar to that of the organization mentioned. (1 not similar to 5 very similar)
 - f. Please indicate for each organization whether the technical knowledge exchanged are primarily (1) practical and experience based or (2) scientific and formalized.
- 17.) **Could you express from 1 to 5 the importance of the following sources of information for gathering technological knowledge?**
- a. Fairs and exhibitions
 - b. Specialised magazines
 - c. Market surveys
 - d. **Academic journals**
 - e. Are there any other sources of technological knowledge that are not mentioned above?

Part 3: Innovation Performance

This part of the interview concerns the innovation performance of your firm.

- 18.) **Has the firm carried out the following changes in the last three years? (Yes/No)**
- a. **Introduced new or significantly improved products/services on the market?**
 - b. **If yes, is the products/services also new to the firm's market (and not just new for the firm)**

- c. **Made use of new or significantly improved production processes, components or materials**
- d. **Carried out new or significantly improved strategy**
- e. **Carried out new or significantly improved organisational structures**
- f. **Considerably improved market concept**

19.) **Please indicate how much of the turnover of your firm is attributed to (adding up to 100%):**

- a. **New, dramatically improved products/services introduced in the last 3 years: %**
- b. **New, slightly improved products/services introduced in the last 3 years: %**
- c. **Unaltered products/services the last three years %**

20.) **Has the firm applied for patents the last three years?**

- a. **If yes; how many? Give the percentage of co-patenting.**
- b. **If no, why not?**

21.) **Has the firm employees (full-time equivalents) that are occupied with the development of new products /services/ solutions most of the time?**

- a. **Yes**
 - i. **How many**
 - ii. **Has the firm an R&D-department?**
- b. **No**

How much company's time is devoted for the development of of new products /services/ solutions?

Part 4: Policy Initiatives

The last part of the interview concerns the firms' awareness of existing policy initiatives including public organizations, and investigates their effectiveness.

22.) **Which policy initiatives supporting innovation have you used so far (at the regional, national, international level)?**

23.) **Have you heard of policy initiatives focusing on the regional level (including cluster initiatives) (if the interviewee has not heard of a single initiative continue with question 26)**

- a. **Moving Media Southern Sweden**
- b. **Media Mötesplats Malmö**
- c. **Moving Media Centre/Moving Media City**
- d. **Öresunds Filmkommission**
- e. **Film i Skåne**
- f. **Öresund IT (previously named Öresund IT Academy)**
- g. **Wireless Valley**
- h. **Any other...**

24.) **Which of the above mentioned initiatives have you used? (if the interviewee has not used a single initiative continue with question 26)**

- a. **Moving Media Southern Sweden**

- b. Media Mötesplats Malmö
 - c. Moving Media Centre/Moving Media City
 - d. Öresunds Filmkommission
 - e. Film i Skåne
 - f. Öresund IT (previously named Öresund IT Academy)
 - g. Wireless Valley
 - h. Any other...
- 25.) Specify for the above mentioned policy initiative the way in which you benefited (multiple answers possible). This question is repeated for each mentioned policy initiative.
- a. access to market knowledge
 - b. access to technological knowledge
 - c. sharing of knowledge with customers
 - d. sharing of knowledge with suppliers
 - e. sharing of knowledge with competitors
 - f. sharing of knowledge with universities / research institutes
 - g. sharing of laboratories
 - h. human resource development (upskilling, training)
 - i. management knowledge
 - j. financial provisions
- 26.) Why have you not received support of any of the named initiatives? (Multiple responses possible)
- a. Project was turned down
 - b. Lack of information about support programmes
 - c. Complicated structure of support system
 - d. Lack of time
 - e. Supporting instruments do not fit for the company
 - f. Other
- 27.) What support would your firm need?
- a. Financial support of innovation projects
 - b. Education and training of employees
 - c. Information about markets
 - d. Information about new technologies
 - e. Consultancy
 - f. Help to find partners
 - g. Etc

Thank you for the interview. If you would like to receive a copy of the final research report, please indicate here.

Appendix 2

Questions for semi-structured interviews

SE017 TAT – The Astonishing Tribe. Technology based. Year 2002

1. In a previous interview we asked you to grade the importance of university education for the staff you recruit to the company on a scale from 1 to 5. You chose the grade 5, meaning that university education is very important for your staff. I would like you to elaborate a bit further in this and explain why university education is looked upon as a critical resource. What are the advantages of higher education, compared to other types of skills received through experience and daily practice? Could you give examples of concrete situations in which the solving of problems faced benefit from knowledge that gained at university?
2. Do you collaborate with universities, formally or informally? Could you give examples of situations in which universities could become an attractive partner?
3. In the previous interview you also informed us that the company has introduced new products, strategies and organizational structures the past couple of years. Should these three types of innovations be understood as separate processes, or are they interrelated? If they are interrelated, could you elaborate a little bit on how? (One leads to the other?)
4. To what extent would you describe your innovations (those discussed above) as results of interactive processes involving firm-external partners? To what extent are they initiated by needs and/or opportunities created as a result of other innovations carried out in the field in which you operate?
 - a. E.g., innovations made by suppliers enable you for new creation of new products?
5. Could you give an example of how an idea was developed to a profitable product? I am interested in the whole processes/problem sequence, including timing of different sub-activities and in what ways internal as well as external partners were involved at different stages?

SE005 Do-Fi. Technology based. Year 2006

1. In a previous interview we asked you to grade the importance of university education for the staff you recruit to the company on a scale from 1 to 5. You chose the grade 5, meaning that university education is very important for your staff. I would like you to elaborate a bit further in this and explain why university education is looked upon as a critical resource. What are the advantages of higher education, compared to other types of skills received through experience and daily practice? Could you give examples of concrete situations in which the solving of problems faced benefit from knowledge that gained at university?
2. Malmö University was mentioned as important partner for technology knowledge. Why is it an important source? Could you elaborate more how the knowledge flows from University to the company? Could you give examples of more situations in which universities could become an attractive partner?

3. You evaluated academic journals as sources for market and technology knowledge as 3. Could you give any concrete examples when information you got from such journal was used in your daily work?

- general orientation;
- actual problem solving;
- market opportunities;
- technological innovations;
- marketing innovations.

4. In the previous interview you also informed us that the company has introduced new products and made use of new processes and materials. Should these two types of innovations be understood as separate processes, or are they interrelated? If they are interrelated, could you elaborate a little bit on how? (One leads to the other?)

5. To what extent would you describe your innovations (those discussed above) as results of interactive processes involving firm-external partners? To what extent are they initiated by needs and/or opportunities created as a result of other innovations carried out in the field in which you operate?

a. E.g., innovations made by suppliers enable you for new creation of new products?

6. Could you give any examples of how new products were created and introduced to the market? I am interested in the whole processes/problem sequence, including timing of different sub-activities and in what ways internal as well as external partners were involved at different stages?

SE031 Mindpark. Artistic based Year 2007

1. We can see that the majority of your staff have a university education, but in a previous interview you described the importance of university education for future employment as low. This could be seen as a paradox, and I would like you to elaborate a bit on how you perceive the importance of university education among your staff. Does it mean that just education is not enough (i.e. that it need to be complemented with other types of skills) or that education is not an important factor at all (i.e. that other types of skills is sufficient)? What kind of qualifications do you find most important when recruiting new staff? If a person does not have any work experience yet, what could persuade you to get him/her employed anyway?

2. Do you collaborate with universities, formally or informally? Could you give examples of situations in which universities could become an attractive partner?

3. In the previous interview you also informed us that the company has introduced new products, strategies and organizational structures the past couple of years. Should these three types of innovations be understood as separate processes, or are they interrelated? If they are interrelated, could you elaborate a little bit on how? (One leads to the other?)

4. To what extent would you describe your innovations (those discussed above) as results of interactive processes involving firm-external partners? To what extent are they initiated by needs and/or opportunities created as a result of other innovations carried out in the field in which you operate?

a. E.g., innovations made by suppliers enable you for new creation of new products?

5. Could you give an example of how an idea was developed to a profitable product? I am interested in the whole processes/problem sequence, including timing of different sub-activities and in what ways internal as well as external partners were involved at different stages?

SE001 Anagram Produktion. Artistic based. Year 2003

1. University education is of a low importance in your company. What kind of qualifications do you find most important when recruiting new staff? If a person does not have any work experience yet, what could persuade you to get him/her employed anyway?

2. Do you collaborate with universities, formally or informally? Could you give examples of situations in which universities could become an attractive partner?

3. You evaluated academic journals as sources for market and technology knowledge as 3. Could you give any concrete examples when information you got from such journal was used in your daily work?

- general orientation,
- actual problem solving,
- market opportunities
- technological innovations
- marketing innovations

4. In the previous interview you also informed us that the company has introduced new products, organizational structures, market concept and made use new material/processes in the past couple of years. Should these types of innovations be understood as separate processes, or are they interrelated? If they are interrelated, could you elaborate a little bit on how? (One leads to the other?)

5. To what extent would you describe your innovations (those discussed above) as results of interactive processes involving firm-external partners? To what extent are they initiated by needs and/or opportunities created as a result of other innovations carried out in the field in which you operate?

a. E.g., innovations made by suppliers enable you for new creation of new products?

6. Could you give an example of how an idea was developed to a profitable product? I am interested in the whole processes/problem sequence, including timing of different sub-activities and in what ways internal as well as external partners were involved at different stages?

Appendix 3

Table 1. Relations with university and innovativeness rate.

Firm id / NACE code	Higher education in firm	University for recruitment	Academic journal market/tech	Importance of university knowledge	Relations with university total	New products	New processes	New strategy	New organizational structures	Market concept	Turn over from innovation	Patents	Time for innovation	Innovativeness rate
SE0015911	2	1	1/3	3	10	5	5	0	5	5	4	n/a	3	3,9
SE0027311	3	4	3/3	0	13	5	5	5	5	5	5	n/a	1	4,4
SE0037410	5	4	1/1	0	11	0	5	0	5	0	4	n/a	1	2,1
SE0047022	5	5	3/3	5	21	5	5	5	0	0	5	n/a	3	3,3
SE0056202	5	5	3/3	5	21	5	5	0	0	0	5	n/a	4	2,7
SE0065911/7410	5	3	2/2	0	12	0	0	5	5	0	n/a	n/a	4	2,3
SE0075911	0	1	3/3	0	7	5	5	0	0	5	1	n/a	2	2,6
SE0196209	3	3	1/2	0	9	5	0	5	5	5	1	0	2	2,9
SE207311	0	1	1/1	0	3	0	0	0	5	0	3	n/a	2	1,4
SE0217410	5	2	4/4	5	20	5	5	5	5	5	4	n/a	5	4,9
SE0115911	3	4	5/5	0	17	3	0	0	0	5	4	n/a	3	2,1
SE0125911	0	1	1/1	0	3	3	5	5	0	0	5	n/a	3	2,6
SE0147022	3	3	2/2	2	12	5	5	5	5	5	3	0	1	3
SE0157112	5	5	1/1	0	12	5	5	5	5	0	1	5	3	3,5
SE0167021	3	2	3/4	0	12	3	5	5	5	5	4	n/a	2	4,1
SE0176202	5	5	2/1	0	13	5	0	5	5	0	5	5	2	3,4
SE0186201	5	5	5/5	0	20	3	5	5	0	n/a	n/a	3	5	3,5
SE0225911/7410	3	5	4/4	0	16	0	5	0	0	0	5	n/a	5	2,1
SE0235911/7410/9003	3	2	1/1	0	7	0	5	0	0	0	2	n/a	n/a	1,2
SE0247410	5	2	2/2	0	11	0	5	5	0	5	0	n/a	2	2,4
SE0255911	5	4	2/2	0	13	5	5	5	5	0	5	n/a	2	3,9
SE0266110	0	1	3/3	0	7	5	5	5	0	5	4	0	2	3,4
SE0276201	5	4	4/4	5	22	5	5	5	5	5	5	n/a	n/a	5
SE0295821	3	4	2/4	0	13	5	5	5	5	5	5	n/a	5	5
SE0285911	4	1	3/3	3	14	3	0	0	5	0	5	n/a	1	2
SE0307410	3	1	2/1	0	7	0	0	0	0	5	5	n/a	1	1,6
SE0317022	4	2	1/1	0	8	5	5	5	5	5	5	n/a	2	4,6
SE0335914/	5	1	2/2	0	10	3	5	5	0	5	0	n/a	2	2,9

7311														
SE034 7410	5	1	3/3	0	12	3	0	5	5	5	5	n/a	3	3,7
SE248 7022	5	5	4/2	5	21	3	0	5	5	5	0	n/a	n/a	3
SE349 7311	5	2	2/3	0	12	5	5	5	5	5	5	1	3	4,3
SE350 264/6 20	4	3	1/1	0	9	3	5	0	5	0	3	0	n/a	2,3
SE008 7021	0	2	1/1	0	4	0	0	0	0	0	0	n/a	n/a	0
SE009 5911	3	2	1/1	0	7	5	5	5	0	0	5	n/a	2	3,1
SE010 3240	5	4	1/1	0	11	5	5	5	0	0	5	n/a	3	2,3
SE032 5811	5	4	3/2	0	14	5	0	5	0	5	3	n/a	1	2,7

Table 3. The companies, having low RUV.

Firm id / NACE code	Higher education in firm	University for recruitment	Academic journal market/tech	Importance of university knowledge	RUV	New products	New processes	New strategy	New organizational structures	Market concept	Turn over from innovation	Patents	Time for innovation	Innovation rate
SE026 6110	0	1	3/3	0	7	5	5	5	0	5	4	0	2	3,4
SE007 5911	0	1	3/3	0	7	5	5	0	0	5	1	n/a	2	2,6
SE20 7311	0	1	1/1	0	3	0	0	0	5	0	3	n/a	2	1,4
SE012 5911	0	1	1/1	0	3	3	5	5	0	0	5	n/a	3	2,6
SE023 5911/ 7410/ 9003	3	2	1/1	0	7	0	5	0	0	0	2	n/a	n/a	1,2
SE030 7410	3	1	2/1	0	7	0	0	0	0	5	5	n/a	1	1,6
SE008 7021	0	2	1/1	0	4	0	0	0	0	0	0	n/a	n/a	0
SE009 5911	3	2	1/1	0	7	5	5	5	0	0	5	n/a	2	3,1

Table 4. The companies, having high RUV.

Firm id / NACE code	Higher education in firm	University for recruitment	Academic journal market/tech	Importance of university knowledge	RUV	New products	New processes	New strategy	New organizational structures	Market concept	Turnover from innovation	Patents	Time for innovation	Innovation rate
SE0186201	5	5	5/5	0	20	3	5	5	0	n/a	n/a	3	5	3,5
SE0056202	5	5	3/3	5	21	5	5	0	0	0	5	n/a	4	2,7
SE0276201	5	4	4/4	5	22	5	5	5	5	5	5	n/a	n/a	5
SE0047022	5	5	3/3	5	21	5	5	5	0	0	5	n/a	3	3,3
SE0217410	5	2	4/4	5	20	5	5	5	5	5	4	n/a	5	4,9
SE0115911	3	4	5/5	0	17	3	0	0	0	5	4	n/a	3	2,1
SE0225911/7410	3	5	4/4	0	16	0	5	0	0	0	5	n/a	5	2,1
SE2487022	5	5	4/2	5	21	3	0	5	5	5	0	n/a	n/a	3

Table 5. The companies, having medium RUV.

Firm id / NACE code	Higher education in firm	University for recruitment	Academic journal market/tech	Importance of university knowledge	RUV	New products	New processes	New strategy	New organizational structures	Market concept	Turnover from innovation	Patents	Time for innovation	Innovation rate
SE0196209	3	3	1/2	0	9	5	0	5	5	5	1	0	2	2,9
SE0157112	5	5	1/1	0	12	5	5	5	5	0	1	5	3	3,5
SE0176202	5	5	2/1	0	13	5	0	5	5	0	5	5	2	3,4
SE350264/620	4	3	1/1	0	9	3	5	0	5	0	3	0	n/a	2,3
SE0015911	2	1	1/3	3	10	5	5	0	5	5	4	n/a	3	3,9
SE0027311	3	4	3/3	0	13	5	5	5	5	5	5	n/a	1	4,4
SE0037410	5	4	1/1	0	11	0	5	0	5	0	4	n/a	1	2,1
SE0065911/7410	5	3	2/2	0	12	0	0	5	5	0	n/a	n/a	4	2,3
SE0147022	3	3	2/2	2	12	5	5	5	5	5	3	0	1	3
SE0167021	3	2	3/4	0	12	3	5	5	5	5	4	n/a	2	4,1
SE0247410	5	2	2/2	0	11	0	5	5	0	5	0	n/a	2	2,4
SE0255911	5	4	2/2	0	13	5	5	5	5	0	5	n/a	2	3,9
SE0295821	3	4	2/4	0	13	5	5	5	5	5	5	n/a	5	5
SE0285911	4	1	3/3	3	14	3	0	0	5	0	5	n/a	1	2
SE0317022	4	2	1/1	0	8	5	5	5	5	5	5	n/a	2	4,6
SE0335914/7311	5	1	2/2	0	10	3	5	5	0	5	0	n/a	2	2,9
SE0347410	5	1	3/3	0	12	3	0	5	5	5	5	n/a	3	3,7
SE3497311	5	2	2/3	0	12	5	5	5	5	5	5	1	3	4,3
SE0103240	5	4	1/1	0	11	5	5	5	0	0	5	n/a	3	2,3
SE0325811	5	4	3/2	0	14	5	0	5	0	5	3	n/a	1	2,7