HOCHSCHULE KOBLENZ
UNIVERSITY OF APPLIED SCIENCES

Wissenschaftliche Schriften

# Academic Consulting

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Fachbereich
**Wirtschaftswissenschaften**
**Nr. 9 - 2012**

Wissenschaftliche Schriften des Fachbereichs Wirtschaftswissenschaften
Hochschule Koblenz - University of Applied Sciences

# Experts for sale:
# Academic consulting as mechanism for knowledge and technology transfer

by

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Vollbeleg: Sellenthin, Mark O.: Experts for sale: Academic consulting as mechanism for knowledge and technology transfer, in: Wissenschaftliche Schriften des Fachbereichs Wirtschaftswissenschaften, Hochschule Koblenz -University of Applied Sciences, Nr. 9

Koblenz, September 2012

ISSN 1868-3711

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## ACADEMIC CONSULTING

Academic consulting is an important mechanism to transfer tacit knowledge as well as facilitates the transfer of codified knowledge, such as patents. However, not all researchers are equally interested in consulting. A lot of researchers refrain from industry collaboration since external involvement in research issues could be regarded immoral according to the traditional Humboldt university ideal. However, external involvement increases through external funding, in particular from industrial sources and the general public demands universities to become more entrepreneurial in order to increase economic growth and welfare.

The question that remains to be answered is which factors impact on the decision of university researchers to engage in consulting assignments? This paper contributes with an empirical analysis of this issue and is based on a survey of university professors in Germany and Sweden.

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# 1 INTRODUCTION

Knowledge and technology transfer from university to industry has gained increasing public attention in recent years (OECD 1999, 2002, 2003a, 2003b, European Commission 2001). Several studies have shown that universities are important for the innovation system and that academic research can spur industrial innovation (e.g., Jaffe, 1989; Mansfield, 1995, 1998 Gibbons et al., 1994; Etzkowitz and Leydesdorff, 2000; Martin and Etzkowitz, 2000; Martin 2003; Mowery and Sampat, 2005). Universities provide trained personnel and advanced research, which are the key factors behind economic development and growth. However, the role of the university in the innovation system is also influenced by the structure and technological specialisation of the domestic industry, the size and structure of other public and private performers of R&D or cultural factors that determine the prestige of scientists in society. Particularly relevant is the ability of industry to take advantage of the findings from academic research.[1]

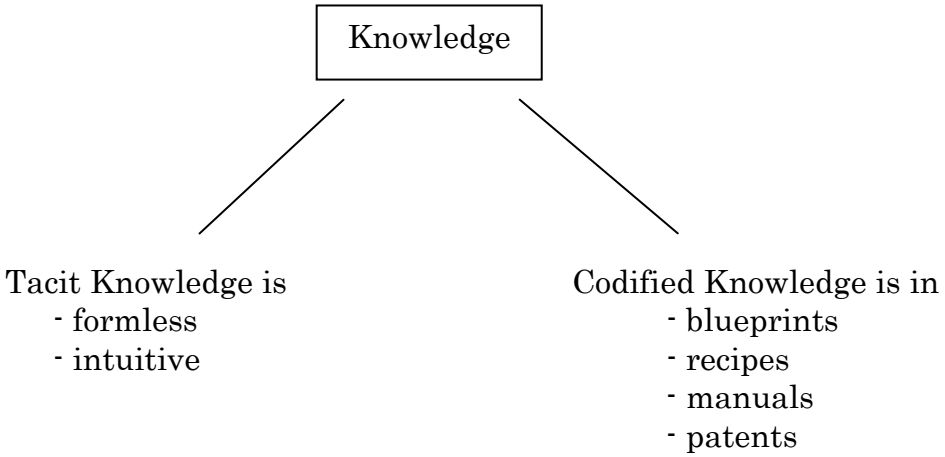
Indeed, there is a large variety of different means to transfer knowledge and technology. Gibbons et al. (1994) mention that the traditional ways of technology transfer were the hiring of graduates, publication of research results, and consulting. However, in the beginning of the 1980s, a number of new channels of knowledge and technology transfer were developed such as university patent offices, liaison programmes, and industrial sponsorship of research groups. In particular, university patenting and licensing has gained attention in the recent years (e.g., Jensen and Thursby 2001, Mowery et al. 2001, Sellenthin 2009). However, different types of knowledge need different types of transfer mechanisms. The distinction between tacit and codified knowledge becomes important in this context. Codified knowledge is represented in blueprints, recipes, manuals or patents whereas tacit knowledge is not codified and is therefore, difficult to grasp and even articulate. Codified knowledge can be explicitly related to other areas of codified knowledge whereas tacit knowledge remains in a formless, intuitive kind (Polanyi 1958, Boisot 1983). This is very relevant for the whole innovation process which is associated with frequent feedback loops between the users and developers of new technology.[2] It is likely that university knowledge and university inventions encompass a large share of tacit knowledge which is difficult to codify and even to articulate. For example, university inventions are usually in a quite premature phase where the idea needs further explanation and development in order to allow for a patent application. This type of idiosyncratic knowledge is difficult to transfer. A mechanism that can help in this context is academic consulting. Consulting can take different forms, such as the provision of advice to firms or public bodies. It can be used to facilitate the transfer of more codified forms of knowledge, such as patenting and licensing. Consulting can be seen as an informal mechanism to transfer knowledge and technology. Pavitt (2005, p. 93) argues that "informal relationships give practitioners entry points into the academic world, people who they can ask about where the important developments lie and who the relevant people are."

[1] The absorptive capacity of firms becomes important in this context Cohen and Levinthal (1990).
[2] This is related to the chain-linked model of innovation as shown by Kline and Rosenberg (1986).

Goldfarb and Henrekson (2003, p. 643) argue in their paper about commercialisation policies at Swedish and US American universities that consulting is a frequently used mechanism for transfer. They define consulting arrangements as a mechanism "whereby the researcher either spends a limited amount of time working for the firm and/or takes up a position on one of the firm's boards" (ibid., p. 643). Financial incentives can be quite important for the researchers since "academics are often compensated quite generously for such activities" (ibid., p. 643).

Thus, consulting can be a source of additional income for researchers. So, consulting can be regarded as a kind of service assignment in which the researcher acts as a kind of external expert for the firm. Consulting can also be used in combination with other channels of knowledge and technology transfer. This is particularly relevant in the context of patenting and licensing of university research. Technology transfer by means of patents and licences seems to be a particularly complex transfer mechanism. It frequently requires the active participation of the inventor. Jensen and Thursby (2001) have shown that the vast majority of university inventions require further development. In a survey targeted at technology transfer offices at 62 US research universities, they found that only 12 percent of the university inventions were ready for commercial use. Furthermore, "over 75 percent of the inventions licensed were no more than a proof of concept (48 percent with no prototype available) or lab scale prototype (29 percent) at the time of license! Thus, an overwhelming majority of university inventions require further development once they are licensed" (ibid., p. 243). Jensen and Thursby´s survey shows that for 71 percent of the inventions licensed, successful commercialisation requires further cooperation by the inventor and the licensee. Thus, although a patent represents codified knowledge, the whole invention is likely to encompass a large share of tacit knowledge. This type of idiosyncratic knowledge is difficult to transfer.

**Figure 1: Tacit and Codified Knowledge**




Source: own research

Consulting assignments by researchers can facilitate transfer. Goldfarb and Henrekson (ibid., p. 642) hint at the study by Jensen and Thursby (2001) and claim that "survey results suggest that the form of inventor involvement most preferred by academics is research grants".

Thus, consulting in combination with industry funding can be quite effective in transferring tacit knowledge to firms. This shows that different transfer mechanisms can work intertwined as argued by Pavitt (2005, p. 94) "the informal relationships can result in formal outputs that can in turn trigger more informal contacts".

Another major trend with regard to university-industry collaboration is the changing composition of funding. The private industry is funding an increasing share of research in universities (Geuna 1999, 2001) and as argued by Gulbrandsen and Smeby (2005), there is a general trend across the OECD that the share of base funding for universities is decreasing. Consulting assignments of researchers can be a way to overcome financial difficulties. Universities themselves encourage their researchers to become integrated into networks with other researchers inside and outside of academia. As argued by Powell and Grodal (2005, p. 58), "complex networks of firms, universities, and government labs are critical features of many industries, especially so in fields with rapid technological progress, such as computers, semiconductors, pharmaceuticals, and biotechnology". Thus, universities encourage their scholars to become more "entrepreneurial" which involves externally-funded projects and consulting to an increasing extent.[3] Germany and Sweden are interesting cases in this context since both countries have a rather long history of university-industry collaboration and public policy supports technology transfer with substantial resources.[4]

Since 1997, the Swedish universities have to fulfil the "third mission". It means that universities should besides teaching and research "interact with the surrounding society" (Högskoleverket 2008). Although, the third mission is interpreted quite broadly including popular lectures for the general public, newspaper articles by scholars, participation in TV debates, the main focus in the public discussion is on interaction with industry. In Germany, the exploitation offensive of the federal government stresses university-industry collaboration and aims "to put scientific research results faster on the market" (BMBF 2001, p. 2). Since 2002, patenting and licensing of university research is supported by a network of patent and exploitation agencies that assist the universities.

[3] The term "entrepreneurial university" is frequently used in this context. Braunerhjelm et al. (2003, p. 35, own translation) argue that an entrepreneurial university is an "informal alliance between research, privately and publicly funded links to the market, entrepreneurs and firms". The primary characteristic of an entrepreneurial university is the open attitude towards interaction with society and to orient the direction, organisation, funding, and the conducting of research to the surrounding society's benefits and values. In contrast, the traditional Humboldt ideal of the university emphasises the autonomy of the scholars (Keck 1993).

[4] There are a number of studies that assess knowledge and technology transfer in Germany, see for instance Schmoch et al. (2000), Czarnitzki et al. (2000), Beise and Stahl (1999), Cohausz et al. (1998). In Sweden, knowledge and technology transfer has been widely debated, see for instance SOU (1996), VINNOVA (2003), SOU (2005). The US is frequently regarded as a kind of role model with respect to commercialisation of research results from universities. Thus, there is a large body of literature about technology transfer in the US that often guides the discussion in Europe. See, for instance, Bozeman (2000), Bercovitz et al. (2001), Carlsson and Fridh (2002), Jensen and Thursby (2001), Mowery et al. (2001), Siegel et al. (2003).

In sum, academic consulting is a highly relevant means to transfer knowledge and technology from university to industry. It builds upon previous contacts and the reputation of individual researchers, can facilitate more formal ways of transfer since it eases the transfer of tacit knowledge. Furthermore, academic consulting can act to overcome financial difficulties of university researchers facing decreasing base funds.
The purpose of this paper is to analyse the factors that impact on the decision of researchers to engage in consulting assignments. It contributes with an empirical analysis of the incentives of researchers in Sweden and Germany.

## 2 CONCEPTUAL FRAMEWORK

The basic hypothesis of this article is that university professors who engage in consulting assignments are significantly different from university professors without consulting assignments and that these differences can be explained by the experience of researchers with knowledge transfer, incentive structures inside the university, funding constraints, and the individual attitude of researchers with regard to industry collaboration, commercial issues, and risk.

### Development of hypothesis 1

Social networks are important for knowledge and technology transfer (Powell 1990, Liebeskind et al. 1996). It can be expected that experienced researchers are better integrated in social networks with other academic peers as well as with industrial firms. Furthermore, empirical evidence indicates that experience, as measured by years of tenure, has a positive impact on the transfer of commercial technology (Link et al. 2007). It can be suspected that experience with other transfer mechanisms fosters academic consulting. The empirical study by Geuna and Nesta (2003) has found that patents and academic entrepreneurship lead to increased contract research. Consulting as a rather informal link between university researcher and firm can, therefore, be seen as a complementary mechanisms to more formal ways of knowledge and technology transfer. This is in line with the argument put forward by Powell and Grodal (2005, p. 71) who claim that "there is a strong sense among researchers that informal relations undergird formal ties". Thus, it can be suspected that experience with other mechanisms of knowledge and technology transfer has a positive impact on the incentives of researchers to take on consulting assignments which leads to the following hypothesis:

**Hypothesis 1:** Experience of a researcher - in terms of years as professor and with other channels of knowledge and technology transfer - has a positive impact on the propensity to engage in consulting assignments.

### Development of hypothesis 2

As mentioned, universities are increasingly emphasising links to industry. University policy can play an important role in this context since it can affect the incentive and reward structure of the individual researchers.

In general, universities have a number of "soft" measures such as strategy and policy documents that define the goals of the university and future orientations and plans with regard to third mission efforts. The empirical study by Sellenthin (2009) found that the majority of Swedish professors claim that external funding impacts on their salary in the long run. This suggests that there are even formal ways to reward third mission efforts, since there is a general trend towards an increasing share of external funding stemming from industrial sources in the OECD countries (OECD 1999). However, the same study did not find such a connection for German researchers. Another way to strengthen university-industry collaboration is to develop collaborative research centres. In Sweden, there are particular funding programmes to fund these research centres. The aim of these centres is to conduct applied research.[5] Those research centres involve companies that also have to provide funding to the research centre.[6] In addition, substantial public infrastructure for patenting and commercialisation of research results has been built up in both countries (Sellenthin 2009).

Thus, we can suspect that in universities that encourage interaction with firms, scholars have strong incentives to engage in consulting assignments as the following hypothesis indicates:

**Hypothesis 2:** An organisational environment that emphasises the need for interaction with the surrounding society facilitates the propensity of individual researchers to engage in consulting assignments.

### Development of hypothesis 3

As argued, universities seem to put more emphasis on the support of knowledge and technology transfer in general. However, the interests of the individual scholars can be quite different from the university and the incentive structure of individual scholars has to be taken into account. Owen-Smith and Powell (2001, 2003) found that success in technology transfer in the life sciences and the physical sciences depends on the attitudes of researchers towards the technology transfer office.

[5] According to Vinnova that funds the centers "VINN Excellence Centers provide a forum for collaboration between the private and public sectors, universities and colleges, research institutes and other organisations that conduct research. The Centres deal with both basic and applied research and they work to ensure that new knowledge and new technological developments lead to new products, processes and services. VINNOVA's ambition is to establish 25 different VINN Excellence Centers that will be funded for a period of 10 years.

[6] The VINN Excellence programme is the successor of the National Competence Centre Programme that was regarded as quite successful. According to VINNOVA (2006, p. 3), "during the period 1995-2005 Swedish industry and the Swedish government have made a joint investment of Euro 550 million on research collaborations in 28 Competence Centres at 8 universities". Industry paid about Euro 22 million/year, universities Euro 19 million/year, and VINNOVA and the Swedish Energy Agency Euro 19 million/year. Industrial partners contributed to 0.8 million €/year, the host university 0.65 million €/year, and Vinnova or the Swedish Energy Agency 0.65 million €/year on average per competence centre. An assessment of output and performance data has shown that 16 centres have contributed to the start of 43 new firms. In total, 164 patents have been applied for, or filed, within 20 competence centres. The research conducted in the competence centres resulted in 5 300 articles published in international journals and proceedings with referees.

Dasgupta and David (1987, 1994) claim that the main difference between a corporate researcher and a university researcher is not the character of work but the reward system. The academic reward system builds mainly on publications and external funding as criteria of success. Sellenthin (2009) has found that the attraction of external funding and publications in scientific journals are considered as important for the academic career in Sweden and Germany. In addition, researchers in Sweden were even convinced that both criteria impact on their long run salaries. In contrast, only a minority of scholars thought that patents are important for the academic career or the salary. The study by Link and Siegel (2005) found that some academic respondents fear that involvement in technology transfer could have a negative impact on their careers. These fears can lead to a general negative attitude with regard to academic consulting. Thus, individual attitudes with respect to industry collaboration and commercialisation issues can to be quite important and likely to impact on the incentives of scholars to engage in consulting as argued by the following hypotheses:

**Hypothesis 3a:** A positive individual attitude with regard to collaboration with industry impacts positively on consulting.

**Hypothesis 3b:** A negative individual attitude with regard to collaboration with industry impacts negatively on consulting.

### Development of hypothesis 4

In a study about the Swedish funding system, Benner and Sandström (2000, p. 291) claim that "funding is a key mechanism of change in the norm system". They argue that the funding system impacts on the way performance is measured and rewarded. According to Geuna (2001, p. 623), "researchers and, in general, research organizations face different incentives and constraints depending on the source of the funds upon which they rely." In general, external funding is important for academics and as Mansfield (1995, p. 62) reports, for many of the academic researchers in a US sample there was "considerable interaction between them and potential sources of funding". Empirical results show that researchers that face decreasing base funding are more likely to engage in industry-science collaboration (Sellenthin 2011). Thus, Researchers that depend on external sources of funding can be expected to interact more with the surrounding society. Consulting can be a way to overcome financial difficulties.

**Hypothesis 4:** External funding, in particular from industrial sources, impacts in a positive way on the incentives to engage in consulting assignments.

### Development of hypothesis 5

In general, academic consulting means a transfer of knowledge from a university researcher to a private firm. This transfer can be viewed in light of transaction costs economics which basically addresses the issue of different dimensions of the transferred good.

Following Oliver Williamson (1985, p. 52), "the principal dimensions with respect to which transactions differ are asset specificity, uncertainty, and frequency". These so called market factors coupled with the behavioural assumptions of bounded rationality and opportunism determine fundamentally the incentives in the organization of economic activities. There are a number of different mechanisms to transfer knowledge and technology. However, the different mechanisms are associated with different costs and benefits. One mechanism that received increasing attention in the recent years is patenting and licensing of research results. This mechanism is associated with rather high costs since the costs to apply for a patent and to keep it over a period of time can be substantial, depending on the jurisdiction in which the patent is granted. The benefits of university patents are associated with high uncertainty.[7] In contrast, technology transfer through collaboration with industry is associated with small costs in terms of uncertainty, since the university receives a fixed amount of research funding. In a similar way, consulting by individual researchers leads to a fixed income with low risks. As mentioned, the study by Goldfarb and Henrekson (2003) has shown that researchers receive quite generous financial rewards in the case of consulting assignments for firms. Thus, researchers that make the trade-off between costs and benefits will take into account different types of costs and the uncertainty with which benefits might occur in the future. We can suspect that researchers with a risk averse attitude might prefer knowledge and technology transfer mechanisms that are associated with low risks. This leads to the following hypothesis:

**Hypothesis 5:** Researchers with a negative attitude towards risk have strong incentives to engage in consulting assignments.
In addition, structural conditions are likely to influence the decision of researchers to engage in consulting. Gulbrandsen and Smeby (2005) found that applied research is significantly related to industry funding. Thus, a number of structural variables have to be taken into account in the empirical analysis.

## 3 METHOD AND DATA

The purpose of this paper is to analyse the factors that impact on the decision of researchers to engage in consulting assignments. A web-based survey targeted at university professors in natural sciences, engineering sciences and medical sciences in Sweden and Germany was conducted. Researchers in both countries were asked whether they engaged in consulting assignments and about their experience with different transfer channels, attitudes with regard to commercial issues, their funding situation and other background variables. The dependent variable that is used is "Consulting" and measures whether researchers engaged in consulting assignments.[8]

[7] As Lita Nelsen, CEO of MITs Technology Licensing Office (TLO) argued "although a very few, and highly visible, "blockbuster" inventions have made tens of millions for universities, most university licensing offices barely break even" (Science 1998, Vol. 279, cited in Deiaco et al. 2002, p. 115).

[8] The survey was conducted in spring 2005 and the scholars were asked whether they engaged in consulting assignments in 2002 to 2004.

A stratified sample of researchers in engineering, medicine and the natural sciences was drawn and a questionnaire was sent to 4645 researchers in Sweden and Germany. The questionnaire addressed professors in engineering sciences, medical sciences and the natural sciences since these fields can be assumed as having the highest relevance for industrial innovation. A number of background variables are available for the whole sample such as research field, the size of the university, and the type of university. The number of students enrolled is used as a proxy for the size of the university. With respect to type of university it can be distinguished between technical university and general university. 801 scholars in both countries responded to the questionnaire of which 397 university scholars from Germany and 404 university scholars from Sweden. The response rate of the total survey was 17%. The response rate differed between both countries. In Germany, about 12% answered the questionnaire whereas in Sweden, 30% of the researchers who received the questionnaire answered it. The response rates with regard to scientific fields in Sweden are for the natural sciences 30%, the engineering sciences 33%, and for the medical sciences 27%. The respective figures for Germany are 12%, 14% and 10%. Thus, in both countries, the engineering sciences are somewhat overrepresented, whereas the medical sciences are somewhat underrepresented.

As argued by Sandven and Smith (1998), differential response rates are a typical phenomenon in cross-country surveys and the likely biases have to be accounted for. One way to control for differential response rates is to apply sample selection models in the econometric analysis. In order to account for the non-response in the survey, the Heckman procedure was applied for assessment and control of sample selection bias. The Heckman method was originally suggested by James Heckman (Heckman, 1979) and utilizes two equations, one to predict survey participation and the other to predict consulting. Thus, the two-stage Heckman procedure estimates in a first step the regression parameters from a probit model taking into account background characteristics that are known for the whole sample and then estimates in a second step the propensity to engage in consulting assignments taking into consideration the first estimates. The general model would be:

(1) Propensity to engage in consulting assignments: $Y_{1i} = \beta_1 X_{1i} + \varepsilon_{1i}$
(2) Participation propensity: $Y_{2i} = \beta_2 X_{2i} + \varepsilon_{2i}$

$_i$ = Observation from i=1 to i=n
$Y_{1i}$ = Survey responses for consulting assignments
(1=Yes; 0=No)
$Y_{2i}$ = Participation in the survey (1=Yes; 0=No)
$\beta_1, \beta_2$ = Vectors for exogenous explanatory variables for equations 1 or 2.
$X_{1i}, X_{2i}$ = Parameter vectors for equations 1 or 2.
$\varepsilon j \sim N(0,1)$ with correlation $[\varepsilon_1,\varepsilon_2]$ = rho
$Y_j = 1$ if $Y^*_j > 0$ and 0 else
$(y_{1i}, x_{1i})$ is observed only when $y_{2i}=1$.

## 4 ANALYSIS

Researchers have different motives to engage in different types of knowledge and technology transfer. It was argued that the type of knowledge transferred differs with respect to its codification and the uncertainty of benefits resulting from it. Patenting of university research is often perceived as a particular risky channel and can serve as a reference point with regard to the rather risk free channel of consulting. Patenting is associated with rather large costs and the commercial benefits are quite uncertain. In contrast, the researcher that engages in consulting receives a fixed amount of funding. Thus, patenting can serve as an extreme position to indicate the motives of scholars to engage in particular risky activities or the motives to refrain from it. Table 1 shows the motives of researchers who applied for patents and the motives of researchers who refrained from a patent application.

**Table 1: The motives of researchers to apply for a patent / refrain from patenting.**

| **Motives to apply for a patent** | Sweden | Germany |
|---|---|---|
| To allow for commercial exploitation of the research result | 89.7 | 84.6 |
| To attract research funding | 57.4 | 61.5 |
| To hinder others from exploiting my results | 49.5 | 60.7 |
| To get additional personal income | 38.1 | 42.7 |
| I think it is exciting to take risks | 25.0 | 27.3 |
| Number of observations | 88 | 99 |
| **Motives to refrain from patenting** | | |
| I think it is too time-consuming | 16.7 | 21.7 |
| I think it is too costly | 15.9 | 18.2 |
| I lack knowledge about patenting | 11.2 | 11.6 |
| I think it is too risky | 3.3 | 1.6 |
| Number of observations | 276 | 258 |

Source: own research

Note: The figures show the share of researchers that stated particular motives to apply for a patent or why they refrained from patenting.

The most important motive for researchers that applied for a patent is to allow for commercial exploitation of the research results later on followed by the wish to attract research funding. As already shown by Sellenthin (2009), external funding is important for the academic career of researchers in both countries. Thus, patents can act as a signal of research competence in applied research fields. Another important motive for patenting is to hinder others from exploiting the own research results commercially. For more than one third of the researchers in both countries, the chances to get additional personal income from commercial exploitation acts as an important motive to apply for a patent. For about one fourth of the patenting researchers, the risks associated with the patenting and exploitation process work as important motive.

Thus, these researchers can be regarded as risk-loving individuals. Patenting and commercial exploitation of research results can be perceived as a particular risky and uncertain way of knowledge and technology transfer, thus, researchers who did not apply for a patent were asked about their motives. About 17% of the researchers in Sweden and 22% in Germany think that the patenting process is too time-consuming. A similar share of the researchers refrained from patenting their research results since they thought it would be too costly. More than one tenth of those researchers who did not apply for a patent did so because they lack knowledge about patenting. Risk seems to be less important as a reason to refrain from patenting.

A number of regression analyses were conducted in order to assess the factors that impact on the decision of researchers to engage in consulting assignments. In order to control for sample selection bias a two stage Heckman procedure was applied. The dependent variable "Consulting" distinguishes between those researchers that engaged in consulting assignments in 2002 to 2004 and those researchers that did not engage in consulting. As much as 45.8% of the researchers in Germany and 43.5% of the researchers in Sweden answered that they engaged in consulting assignments in this time period. The regressions measure the propensity of university researchers to engage in consulting. The conceptual framework explained earlier argues that a number of factors are likely to impact on the incentives of researchers to engage in consulting. The variables used in the regressions are shown in table 2.

## Table 2: Variables used in the regressions

| Label | Description | Used as indicator for: | Scale |
|---|---|---|---|
| Consulting | Measures whether the respondent engaged in consulting in 2002 to 2004 | Incentives to engage in consulting | nominal |
| | ***Networking capabilities*** | | |
| Experience as professor | Measures the years of experience as professor | Academic experience | metric |
| Knowledge transfer | Measures whether the respondent has personal experience with training/lectures for firms | Connection to training activities of firms | nominal |
| | ***Attitudes and incentive structures*** | | |
| Informal governance: Previous occupations | Measures the importance of researchers that worked previously in industry as transfer mechanism for the institution | Weight that the institution puts on close industry contacts | nominal |
| Attitude: industry collaboration | Measures whether the respondents thinks that industry collaboration is important | Positive attitude towards industry collaboration | nominal |
| Attitude: Industry funding | Measures whether respondent thinks that it is negative if more research is financed by industry | Negative attitude towards industry collaboration | nominal |
| Attitude: Collaboration and profit | Measures whether respondent thinks that it is not profitable enough for researchers to collaborate with firms | Negative attitude towards industry collaboration | nominal |
| Uncertainty reduction strategy | Researchers were asked about their motives to apply for a patent / refrain from patenting. The motives for non-patenting researchers included lack of knowledge, costs, time and risk of patenting. The main motive of the patenting researchers was to attract research funding. | Risk aversion of individual researchers | nominal |
| | ***Funding constraints*** | | |
| Industry funding | Leaders of research groups were asked about the funding structure of their research group. | Industry funding | metric |
| | ***Structural conditions*** | | |
| Basic research | All researchers were asked about the type of research they carry out primarily. | Basic research | nominal |
| Applied research | All researchers were asked about the type of research they carry out. | Applied research | nominal |
| | ***Response predictors*** | | |
| Natural sciences | Scientific field of the researcher | Scientific field | nominal |
| Medicine | Scientific field of the researcher | Scientific field | nominal |
| Students | Number of students at the university. | Size of university | metric |
| Technical university | Measures whether the university is a technical or a more general | Technical orientation | nominal |
| Country | Dummy variable for country | Institutional structures (e.g., patent rights) | nominal |

Source: own research

A number of independent variables have to be considered.

### Networking capabilities

Experience of the researcher can have a high impact on the incentives of researchers to engage in consulting. Therefore, an important independent variable is individual experience as measured by the number of years as professor. It can be suspected that researchers with long experience have access to a well developed network of contacts inside and outside of academia. Experience with other channels for knowledge and technology transfer can be quite important. A mechanism that is quite close to academic consulting is training, therefore, researchers were asked whether they provided tailor-made lectures or training to private firms. This variable measures the experience of scholars with knowledge transfer. Researchers that already taught courses for participants from industry are likely to have lower barriers to engage in consulting activities.

### Attitudes and incentive structures

Furthermore, individual researchers have very different attitudes with regard to commercial issues reflecting partly the struggle between the Humboldt ideal and the entrepreneurial ideal of university. Therefore, a number of questions assessed their personal attitudes regarding commercialisation of research. Researchers were asked whether they think that collaboration with industry is important or whether they have the opinion that it is negative if more research is financed by industry. The respondents were also asked whether they think that it is not profitable enough to collaborate with firms.

The weight that is put by the organisational environment on different transfer mechanisms can also be quite influential with regard to the incentives to engage in consulting. Researchers were asked about the importance of different channels for knowledge and technology transfer for the institution, such as commissioned research, joint patent applications, personnel mobility. Particularly influential can be contacts from previous occupations in industry, i.e. researchers that conduct research at the university but were previously employed in industry. These informal contacts to previous employers can be quite important in attracting consulting assignments. Therefore, the independent variable "Informal governance: previous occupations" measures whether this transfer mechanisms is of high importance to the institution at which the researcher conducts research.

Different transfer channels are associated with costs and risks. On one extreme side there is commissioned research which is associated with low uncertainty and on the other extreme is patenting of university research which can be seen as a quite risky transfer channel since the commercial outcomes of a patent are quite uncertain. The variable "Uncertainty reduction strategy" summarises the motives why respondents applied for a patent or why they did not apply for a patent. Researchers were asked whether they applied for a patent in 2002 to 2004. The variable takes on 1 if researchers who applied for a patent did this in order to attract research funding which is a quite risk free way of knowledge and technology transfer. Patenting is

frequently used as signal in order to attract research funding. The patent is in these cases not used in order to engage in risky activities like commercialisation but in order to attract research grants. The variable takes on 1 if researchers who did not apply for a patent did so because they lack knowledge about patenting, think the patenting process is too time-consuming and too costly.

Furthermore, patenting researchers were asked whether they applied for a patent because they think it is exciting to take risks and researchers who did not apply for a patent were asked whether they did not apply because they do not like to take risks. Thus, the variable "Uncertainty reduction strategy" is associated with a negative attitude towards risk in general and the motives of researchers not to engage in risky activities.

### Funding constraints

It can be assumed that the funding situation of individual researchers acts as constraint on their behaviour with respect to consulting. Therefore, the scholars were asked about the share of research funding that stems from industrial sources. As argued, consulting is frequently used in combination with other mechanisms for knowledge and technology transfer. Thus, we might suspect that a large share of industry funding increases the likelihood to engage in consulting.

### Structural conditions

Furthermore, the researchers were asked whether they conduct primarily basic research or applied research which was used as an indicator for research orientation. The comparative design (comparison Sweden-Germany) takes into account the different country characteristics, such as different formal patent rights regimes etc.[9]

### Response predictors

Two types of regression models were estimated in order to assess the impact of a number of independent variables on the dependent variable "Consulting". The first type of model builds upon the Heckman procedure and assesses in a first probit regression the propensity to participate in the survey. These estimates are in a second step incorporated in the probit regression that estimates the propensity to engage in consulting assignments. A number of variables that are available for the whole population were included in the first estimation of the survey participation, such as country, the research field, type of university and the size of the university. In addition, independent probit models were estimated that can be compared to the results utilizing the Heckman procedure. Table 3 shows the regressions.

[9] The ownership regime is different in both countries. In Sweden, the patent rights in the research results are owned by the scholars themselves whereas in Germany, the universities own the patent rights. However, it is unclear whether the patent rights situation has an impact on consulting activities.

Table 3: Coefficient estimates from independent probit regressions and modified Heckman models predicting consulting propensity.

| **Consulting** | 1 Modified Heckman | 2 Indep. probit | 3 Modified Heckman | 4 Indep. probit | 5 Modified Heckman | 6 Indep. probit | 7 Modified Heckman | 8 Indep. probit |
|---|---|---|---|---|---|---|---|---|
| Experience as professor | 0.018 (*) | 0.020 (*) | 0.018 (*) | 0.020 (*) | 0.018 (*) | 0.019 (**) | 0.015 (*) | 0.017 (*) |
| Knowledge transfer | 0.516 (***) | 0.467 (**) | 0.499 (**) | 0.456 (**) | 0.390 (**) | 0.318 (**) | 0.459 (**) | 0.493 (***) |
| Informal governance: Previous occupations | 0.267 (†) | 0.247 (†) | 0.280 (*) | 0.262 (†) | | | | |
| Attitude: Industry collaboration is important | 0.314 | 0.298 | | | 0.352 (*) | 0.354 (†) | 0.306 (†) | 0.348 (†) |
| Attitude: Negative if research is financed by industry | -0.261 (†) | -0.286 (†) | -0.292 (*) | -0.310 (*) | | | | |
| Attitude: Collaboration with industry not profitable | -0.261 (†) | -0.273 (†) | -0.280 (†) | -0.289 (*) | -0.291 (*) | -0.309 (**) | -0.275 (*) | -0.294 (*) |
| Share industry funding | 0.009 (*) | 0.010 (*) | 0.009 (*) | 0.010 (*) | | | | |
| Basic research | | | -0.614 (***) | -0.631 (***) | -0.780 (***) | -0.803 (***) | -0.701 (***) | -0.777 (***) |
| Applied research | 0.506 (**) | 0.530 (**) | | | | | | |
| Uncertainty reduction strategy | | | | | 0.203 (†) | 0.233 (*) | 0.218 (*) | 0.213 (†) |
| Country (Germany = 1) | | | | | | | 0.514 (**) | 0.326 (*) |
| **Participation** | | | | | | | | |
| Country (Germany = 1) | -0.552 (***) | | -0.552 (***) | | -0.642 (***) | | -0.639 (***) | |
| Natural sciences | -0.260 (***) | | -0.259 (***) | | -0.249 (***) | | -0.263 (***) | |
| Medicine | -0.280 (***) | | -0.279 (***) | | -0.322 (***) | | -0.326 (***) | |
| Technical university | -0.142 (†) | | -0.141 (†) | | -0.135 (*) | | -0.121 (†) | |
| Size of university | -9.43e-06 (**) | | -9.48e-06 (***) | | -0.000 (***) | | -0.000 (***) | |
| Wald / LR Chi2 | 60.19 | 67.05 | 61.16 | 67.57 | 83.18 | 87.79 | 77.02 | 93.64 |
| Significance | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Number of observations | 4213 | 363 | 4213 | 363 | 4403 | 553 | 4403 | 553 |
| Uncensored observations | 363 | | 363 | | 553 | | 553 | |
| Pseudo R2 | | 0.133 | | 0.134 | | 0.115 | | 0.122 |

The coefficient estimates of the Heckman equations show the adjusted estimates controlling for non-response. *(†): sig. 10% (*): sig. 5%, (**): sig. 1%, (***): sig. 0.1%.*

The results for the participation regression show that German researchers show a negative propensity to participate in the survey. The same is true for researchers in the natural sciences and the medical sciences. The size of the university has a slightly negative impact on participation propensity. Technical universities show a smaller participation propensity than general universities. The comparison of the modified Heckman regressions and the independent probit regressions indicate that the sample selection bias seems to be rather small since the results are quite robust. The strengths of the relationships as well as the significance levels are fairly similar.

### Hypothesis 1

As could be expected, experience has a positive impact on the propensity to engage in consulting. The experience as professor in terms of number of years since the first professor appointment affects consulting propensity positively. Researchers that have experience with tailor-made lectures and training for firms have a larger propensity to engage in consulting. This confirms hypothesis 1 and indicates that integration into social networks can be quite important for knowledge and technology transfer.

### Hypothesis 2

Organisational factors are important since those researchers that claimed that contacts from previous occupations in industry are an important transfer mechanism at their own institution showed a larger propensity to engage in consulting themselves. Thus, although the organisational environment of researchers provides frequently only informal incentives with respect to knowledge and technology transfer, those researchers that have the impression that previous industrial contacts are valued at their institution have also stronger incentives to engage in academic consulting activities. This finding confirms hypothesis 2.

### Hypothesis 3

Researchers that have experience with training are also more likely to engage in consulting. This fits well with the argumentation that the informal mechanism consulting facilitates more formal ways of transfer. Researchers that have a positive opinion with regard to industry collaboration in general have also a higher propensity to engage in consulting. This result confirms hypothesis 3a. Researchers that think that it is negative if research is financed by industry show a negative propensity to engage in consulting as could be expected. This might be in line with the argumentation that some academics fear that involvement in commercial activities and technology transfer might be detrimental to their academic careers. Thus, hypothesis 3b is confirmed. Scholars that argue that it is not profitable to collaborate with industry have a negative likelihood to engage in consulting. However, this result can be interpreted in the light of missing information. It could be simply prejudices on the side of those researchers without consulting experience. They simply do not have information about how profitable industry collaboration and consulting might be.

### Hypothesis 4

Financial constraints have an impact on knowledge and technology transfer because the larger the share of industry funding the higher the propensity to engage in consulting by the researchers. Thus, researchers that depend on industry funding are also more likely to interact with the surrounding society in the form of consulting activities. This shows that industry funding can trigger consulting and confirms hypothesis 4.

### Hypothesis 5

As already argued, different technology transfer channels are associated with different risks. For the researcher, consulting is a rather risk free channel. They provide advice and receive a fixed income. Scholars that prefer an "Uncertainty reduction strategy" show a larger propensity to engage in consulting. Thus, researchers that applied for patents in order to attract research funding and researchers who refrained from patenting because of the time, costs and risks associated with it had a larger propensity to engage in consulting assignments. This indicates that risk averse researchers might prefer consulting over more risky modes of knowledge and technology transfer. This finding confirms hypothesis 5.

Structural conditions such as the research orientation have a large impact on the incentives to engage in consulting. Researchers that conduct mainly applied research have a positive propensity to engage in consulting assignments whereas their colleagues with a research orientation towards basic research are less likely to engage in consulting as the regression results suggest.
The regressions show that there is a country effect with regard to consulting. German researchers are, in general, more likely to engage in consulting assignments as compared to their Swedish counterparts as the survey results suggest.

# 5 CONCLUSIONS

The purpose of this paper was to analyse the factors that impact on the decision of researchers to engage in consulting assignments. Researchers that engage in consulting are significantly different from researchers who refrain from consulting. Academic experience matters for the decision to engage in consulting since the number of years as professor impacts positively on the likelihood to engage in consulting. The same is true for researchers that have personal experience with the provision of tailor-made courses and training for firms. Thus, we can suspect that personal experience with different transfer mechanism and close relations to firms facilitates consulting.

Governance and incentive structures can be quite influential. Researchers that have the impression that their own academic institution puts special emphasis on close industry contacts show a large propensity to engage in consulting assignments. As could be expected, positive individual attitudes of researchers have a positive impact on the propensity to engage in consulting whereas negative attitudes detain researchers from consulting.

Funding acts as an important constraint since the share of industry funding has a positive impact on the decision of researchers to engage in consulting assignments. The attitude that researchers have with regard to risks acts as a predictor of consulting since researchers that hold rather "defensive" motives with regard to patenting of research results have a higher propensity to engage in consulting than their counterparts with more "offensive" motives. Structural conditions matter since researchers that engage primarily in basic research activities have a negative propensity to engage in consulting whereas applied researchers show a high propensity to engage in consulting assignments.

## 6 SUMMARY

Academic consulting is an important mechanism to transfer tacit knowledge as well as facilitates the transfer of codified knowledge, such as patents. However, not all researchers are equally interested in consulting. A lot of researchers refrain from industry collaboration since external involvement in research issues could be regarded immoral according to the Humboldt university ideal. Nevertheless, external involvement increases through external funding, in particular from industrial sources.

In addition, public policy and society in general demands universities to become more entrepreneurial in order to increase economic growth and welfare through the commercialisation of knowledge produced inside the "ivory tower". This article assesses the factors that impact on the decision of university researchers to engage in consulting assignments. It builds on a survey of university professors in Germany and Sweden and shows the importance of personal experience with different transfer mechanisms, individual attitudes, structural conditions and funding issues.

## SOURCES


**Beise, M., & Stahl, H. (1999)**
Public research and industrial innovations in Germany, Research Policy, 28, 397-422.

**Benner, M. & Sandström, U. (2000)**
Institutionalizing the triple helix: research funding and norms in the academic system. Research Policy, 29, 291-301.

**Bercovitz, J., Feldman, M., Feller, I., & Burton, R. (2001)**
Organizational structure as a determinant of academic patent and licensing behavior: an exploratory study of Duke, Johns Hopkins, and Pennsylvania State universities, Journal of Technology Transfer, 26, 21-35.

**Boisot, M. (1983)**
Convergence revisited: The codification and diffusion of knowledge in a British and a Japanese firm, Journal of Management Studies, 1, 159-190.

**Bozeman, B. (2000)**
Technology transfer and public policy: a review of research and theory, Research Policy, 29, 627-655.

**Braunerhjelm, P., Svensson, P. & Westin, F. (2003)**
Akademiskt entreprenörskap – den svaga länken i de svenska innovationssystemen?, Ekonomisk Debatt, 31 (3), 33-46.

**Bundesministerium für Bildung und Forschung (BMBF) (2001)**
Knowledge Creates Markets – Action Scheme of the German Goverment, Bonn.

**Carlsson, B., & Fridh, A. C. (2002)**
Technology transfer in United States universities: a survey and statistical analysis, Journal of Evolutionary Economics, 12, 199-232.

**Cohausz, Hannig, Dawidowicz & Partner (1998)**
Untersuchung zum Verwertungsprivileg – Relevanz des sog. Hochschullehrerprivilegs nach § 42 ArbNErfG, Gutachten im Auftrag des Bundesministeriums für Bildung, Wissenschaft, Forschung und Technologie, Düsseldorf.

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

**Czarnitzki, D., Rammer, C., & Spielkamp, A. (2000)**
Interaktion zwischen Wissenschaft und Wirtschaft in Deutschland. Ergebnisse einer Umfrage bei Hochschulen und öffentlichen Forschungseinrichtungen, Mannheim: ZEW-Dokumentation Nr. 00-14, ZEW.

**Dasgupta, P., & David, P. (1987)**
Information disclosure and the economics of science and technology, in: Feiwel, G. R. (Ed.), Arrow and the Ascent of Modern Economic Theory, New York: New York University Press.

**Dasgupta P., & David, P. (1994)**
Toward a new economics of science, Research Policy, 23 (5), 487 – 521.

**Deiaco, E., Giertz, E., Reitberger, G., & Rogberg, A. (ed.) (2002)**
Teknikparkens roll i det svenska innovationssystemet – historien om kommersialisering av forskningsresultat, VFI 2002:3, Stockholm: VINNOVA.

**Etzkowitz, H., & Leydesdorff, L. (2000)**
The dynamics of innovation: from national systems and "mode 2" to a triple helix of university-industry-government relations. Research Policy, 29, 109-123.

**European Commission (2001)**
Benchmarking Industry-Science Relations – The Role of Framework Conditions, Final Report, Vienna/Mannheim.

**Geuna, A. (1999)**
The Economics of Knowledge Production: Funding and the Structure of University Research, Cheltenham: Edward Elgar.

**Geuna, A. (2001)**
The changing rationale for European university research funding: are there negative unintended consequences, Journal of Economic Issues, 35 (3), 607-632.

**Geuna, A., & Nesta, L. (2003)**
University Patenting and its Effects on Academic Research, SPRU Electronic Working Paper Series No. 99, Brighton: SPRU.

**Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994)**
The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies. London: Sage Publications.

**Goldfarb, B., & Henrekson, M. (2003)**
Bottom-up versus top-down policies towards the commercialization of university intellectual property, Research Policy, 32, 639-658.

**Gulbrandsen, M., & Smeby, J.-C. (2005)**
Industry funding and university professors' research performance. Research Policy, 34, 932-950.

**Heckman, J. J. (1979)**
Sample selection bias as a specification error, Econometrica, 47, 1, 153-161.

**Högskoleverket (2008)**
Högskoleverkets årsrapport 2008. Stockholm: Swedish National Agency for Higher Education.

**Jaffe, A. B. (1989)**
Real effects of academic research, American Economic Review, 79 (5), 957-970.

**Jensen, R., & Thursby, M. (2001)**
Proofs and prototypes for sale: the tale of university licensing, American Economic Review, 91, 240-259.

**Keck, O. (1993)**
The National System for Technical Innovation in Germany. In: Nelson, R. R. (ed.), National Innovation Systems: A Comparative Analysis. Oxford: Oxford University Press.

**Kline, S., & Rosenberg, N (1986)**
An overview of innovation, in Landau, R. & Rosenberg, N. (eds.) The Positive Sum Strategy, Washington D.C: National Academy.

**Liebeskind, J., Oliver, A., Zucker, L. G., & Brewer, M. (1996)**
Social networks, learning, and flexibility: sourcing scientific knowledge in new biotechnology firms, Organization Science, 7, 428-443.

**Link, A. N., & Siegel, D. S. (2005)**
Generating science-based growth: an econometric analysis of the impact of organizational incentives on university-industry technology transfer, European Journal of Finance, 11, 169-182.

**Link, A. N., Siegel, D. S., & Bozeman, B. (2007)**
An empirical analysis of the propensity of academics to engage in informal university technology transfer, Industrial and Corporate Change, 16, 4, 641-655.

**Mansfield, E. (1995)**
Academic research underlying industrial innovations: sources, characteristics, and financing, Review of Economics and Statistics, 77, 55-65.

**Mansfield, E. (1998)**
Academic research and industrial innovation: an update of empirical findings, Research Policy, 26, 773-776.

**Martin, B.R., & Etzkowitz, H. (2000)**
The origin and evolution of the university species. VEST Journal for Science and Technology Studies,13, 9–34.

**Martin, B.R. (2003)**
The changing social contract for science and the evolution of the university. In: Geuna, A., Salter, A.J., Steinmueller, W.E. (Eds.), Science and Innovation. Rethinking the Rationales for Funding and Governance. Cheltenham: Edward Elgar.

**Mowery, D. C., Nelson, R. R., Sampat, B. N., & Ziedonis, A. A. (2001)**
The growth of patenting and licensing by U.S. universities: an assessment of the effects of the Bayh-Dole act of 1980, Research Policy, 30, 99 – 119.

**Mowery, D. C., & Sampat, B. N. (2005)**
Universities in national innovation systems. In: Fagerberg, J., Mowery, D. C., Nelson, R. R. (eds.) The Oxford Handbook of Innovation. Oxford: Oxford University Press.

**OECD (1999)**
University Research in Transition. Paris: OECD.

**OECD (2002)**
Benchmarking Industry-Science Relationships. Paris: OECD.

**OECD (2003a)**
Governance of Public Research. Paris: OECD.

**OECD (2003b)**
Turning Science into Business: Patenting and Licensing at Public Research Organisations. Paris: OECD.

**Owen-Smith, J. & Powell, W. W. (2001)**
To patent or not: faculty decisions and institutional success at technology transfer, Journal of Technology Transfer, 26, 99-114.

**Owen-Smith, J. & Powell, W. W. (2003)**
The expanding role of university patenting in the life sciences: assessing the importance of experience and connectivity, Research Policy, 32, 1695-1711.

**Pavitt, K. (2005)**
Innovation processes, in Fagerberg, J., Mowery, D. C. & Nelson, R. R. (eds.) The Oxford Handbook of Innovation, Oxford: Oxford University Press.

**Polanyi, M. (1958)**
Personal Knowledge. London: Routledge and Kegan Paul.

**Powell, W. W. (1990)**
Neither market nor hierarchy: network forms of organization, Research in Organizational Behavior, 12, 295-336.

**Powell, W. W., & Grodal, S. (2005)**
Networks of Innovators, in Fagerberg, J., Mowery, D. C. & Nelson, R. R. (eds.) The Oxford Handbook of Innovation. Oxford: Oxford University Press.

**Sandven, T., & Smith, K. (1998)**
Using Community Innovation Survey data for empirical analysis – data reliability and issues for analysts, IDEA Paper Series No. 4, STEP, Oslo.

**Schmoch, U., Licht, G., & Reinhard, M. (eds.) (2000)**
Wissens- und Technologietransfer in Deutschland. Stuttgart: Fraunhofer.

**Sellenthin, M. O. (2009)**
Technology transfer offices and university patenting in Sweden and Germany. Journal of Technology Transfer. Vol. 34(6), 603-620.

Sellenthin, M. O. (2011)
Factors that impact on university-industry collaboration: Empirical evidence from Sweden and Germany. Brussels Economic Review. Vol. 54(1), 81-100.

Siegel, D., Waldman, D., & Link, A. (2003)
Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study, Research Policy, 32, 27-48.

SOU (1996)
Samverkan mellan högskolan och näringslivet. Huvudbetänkande av NYFOR. Stockholm: Fritzes.

SOU (2005)
Nyttiggörande av högskoleuppfinningar. Utredningen om rätten till resultaten av högskoleforskningen. Stockholm: Fritzes.

VINNOVA (2003)
VINNFORSK – VINNOVAs förslag till förbättrad kommersialisering och ökad avkastning i tillväxt på forskningsinvesteringar vid högskolor. Stockholm: VINNOVA.

VINNOVA (2006)
Competence Centres in Figures – Performance and Output Data from the Swedish Competence Centres Programme 1995 – 2005. Stockholm: VINNOVA.

Williamson, O. E. (1985)
The Economic Institutions of Capitalism, New York: Free Press

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