



# Knowledge Transfer Study

2010–2012

<http://www.knowledge-transfer-study.eu>

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## Final Expert workshop

### Knowledge transfer from universities and other public research organisations: findings from two and a half years research

Brussels, European Commission, 12 March 2013

## Summary

### Background

This workshop supported the implementation of the European Commission's 2008 Recommendation on the management of intellectual property (IP) in knowledge transfer (KT) activities and Code of Practice for universities and public research organisations ([http://ec.europa.eu/invest-in-research/pdf/ip\\_recommendation\\_de.pdf](http://ec.europa.eu/invest-in-research/pdf/ip_recommendation_de.pdf)). The event was part of a workshop series covering 39 European countries in 2011 and 2012.

### Attendants

The workshop convened 21 experts, including members of the European Research Area Working Group on Knowledge Transfer (ERAC WG-KT) and representatives from the European Commission and the study team. Attendance was by invitation only. See a list of attendees in the Annex.

### Presentations

This summary includes the main points of the discussion and goes beyond what is included in the presentation files. The presentation files can be viewed and downloaded at <http://knowledge-transfer-study.eu/workshops/final/>.

### Main results

Most KTOs in Europe are still developing experience and capabilities with **managing IP**. With the exception of license income, universities outperform other PROs. European PROs are not as effective as US PROs in commercialising research results. Conversely, European PROs are more efficient compared to US PROs on the number of start-ups and the number of license agreements.

Three of the principles of the **Code of Practice** are seemingly not widely accepted among PROs: the creation of coherent IP portfolios and patent/IP pools (CoP 5), the existence and publication of a licensing policy (CoP 11), and the publication of start-up policies (CoP 12). The other 15 principles are at least partially accepted and in the majority of surveyed institutions implemented.

Interviews with **enterprises** found that they consider the contribution of PROs to innovation as limited. The current rules, practices and incentives at PROs do not serve the purpose of converting scientific knowledge into socio-economic benefits very well. There is no "one-size-fits-all" approach for co-operation between enterprises and PROs, and collecting experiences is important.

Despite progress made, the study shows that there is still a lot of **room for improvement** of PROs' IP capacity and skills in practically all European countries. The increased focus on IP strategies and policies by PROs in Europe is a relatively recent development so that in a few years from now one may even see a correlation between KT policies and KT performance.

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### About the Knowledge Transfer Study 2010-2012



The "Knowledge Transfer Study" (monitoring study regarding the implementation of the Commission Recommendation and Code of Practice on the management of intellectual property in knowledge transfer activities in Member States and Associated Countries) is based on a Contract (No. RTD/Dir C/C2/2010/SI2.569045) between the European Commission, Research Directorate General, and empirica GmbH, the Maastricht Economic Research Institute on Innovation and Technology, and the School of Business of the University of Applied Sciences North-Western Switzerland.



# 1 Welcome and introduction

*Patrick McCutcheon, KTS project officer, DG RTD*

Patrick McCutcheon reminded the ERAC WG on KT that the purpose of the Knowledge Transfer Study was twofold: First, it was a means for the Commission to monitor the implementation of the 2008 Recommendation on KT in a broad sense encompassing the actions of UHEIs and PROs as well as, second, a means to support the ERAC WG in its work in overseeing the implementation of the said Recommendation at the policy level.

He explained that the study comprised four distinct work packages two of which the ERAC WG had been involved, namely the reporting and analysis of measures taken by national administrations and the series of national and regional workshops. Consequently the emphasis would be on the other work packages namely the monitoring of the performance of knowledge transfer offices (KTOs) and the qualitative surveys and interviews.

## 2 Code of Practice implementation and impact (WP3)

### 2.1 KTO survey

*Presentation Franz Barjak*

Summarising the results of surveys of up to 322 universities and other PROs on the implementation of the Code of Practice and the relationship of this to transfer performance, a few general issues appear:

(1) Three of the principles are seemingly not widespread let alone generally accepted among PROs: the creation of coherent IP portfolios and patent/IP pools (CoP 5), the existence and publication of a licensing policy (CoP 11), and the publication of start-up policies (CoP 12). The other 15 principles are at least partially accepted and in the majority of surveyed institutions implemented. Universities, universities with hospitals and non-university institutions have specific transfer patterns. A general backlog in regard to the implementation of the CoP principles appears for small PROs and PROs with small transfer offices.

(2) Publishing policy documents (on IP, publication/dissemination, licensing, and start-up policies) is not common practice at the surveyed PROs. Along the same lines, while PROs monitor internally their IP protection and knowledge transfer activities and achievements (CoP 14), they neglect, to some extent, the publication and dissemination side and consequently might fail to raise their visibility to the private sector.

Universities and other PROs having policies on Intellectual Property, licensing and start-ups also are more successful in the different areas of KTT. In particular, if these policies are in written form they can contribute to a consistent management of different projects. Publishing the content of these policies as well as the available patents, license offers, or new start-ups is **not** linked to a better performance; to the opposite, institutions with a lower KTT performance tend to publish more, presumably with the intention to raise awareness and improve their performance in the future. Whether this is successful cannot be answered with the available cross-sectional data.

(3) PROs provide incentives to mobilise their employees for IP issues and KTT and they let them participate in the resulting revenues in one way or the other (CoP 4, 13). Monetary incentives are, however, a lot more frequent than other incentives, above all among PROs



from countries with established R&D systems (medium to high R&D-density, measured as the R&D personnel per 1000 employees in the country). Using incentives which are more strongly related to the academic culture, such as taking IP/KTT issues into account in career decisions, is current practice in only 30% of the surveyed PROs (and another 10% have begun to consider it).

However, our regressions also show that non-monetary incentives are rather ineffective and they do not relate to transfer performance. In institutions where inventors are entitled to a share of the revenues and/or they receive higher salaries the transfer performance measures are significantly higher. However, the percentage given to inventors is **not** related to performance, contrary to studies using the US AUTM dataset. We explain this with the still rather heterogeneous IP ownership situation for university faculty in Europe and a lower degree of IPR law enforcement than in the US.

(4) Access to and provision of professional KTT services is generally widespread and most KTOs have some staff with a technical background and formal qualification in science or engineering (CoP 10). This applies less to small PROs and PROs with small KTOs, where personnel with management degrees is often common. Training actions are more common for students and less for staff (CoP 6) and they are more popular among the larger institutions and transfer offices.

Knowledge transfer services can either be provided internally, i.e. by the KTO or other offices of the PRO, or externally by service providers on a contract basis. We evaluated whether either form of service provision is related to any of the performance measures. Two findings are remarkable:

- Drafting patent applications is the only service that is predominantly provided externally, in roughly 70% of all PROs. However, institutions (also) providing it internally do not only have significantly higher patent applications, but also higher licence revenues. The ability to draft a patent application requires considerable technical and legal understanding, the existence of which is obviously also conducive to commercialization.
- Serving as a broker between faculty and companies is done mostly internally – by 60% of the PROs – and only by one out of six PROs externally. For raising licence revenues it is beneficial if the service is provided externally and not by the KTO itself; however, for closing R&D agreements the opposite is the case and the KTO is in an advantageous position helping companies to overcome entry barriers.

Supporting start-ups with preferential IP access, infrastructure, management and capacity-building services (training, coaching etc.) is correlated with the number of start-ups. Providing scientific, technological or financial support and having an incubator are insignificant.

(5) Among the different marketing channels, personal channels, such as open days, business roundtables, or personal contacts are rather ineffective for marketing IP and closing licence agreements. Print and electronic channels and in particular the World Wide Web, on the other hand, correlate positively with performance measures.

(6) The type of research (collaborative or contract and the funding arrangements that come with either one) and the type of IP (foreground or background) influence the negotiation of ownership and access rights in the conclusion of research contracts (CoP 17, 18). Common practice is to define this before a project starts, though expressly the sharing of revenues might be agreed upon later in the project or when it becomes clear that such revenues might accrue (CoP 16).

A comparison of regulations and practices in PROs with the European Commission's 2008 Code of Practice was done for 17 countries (where at least 5 PROs had replied to the online surveys) and 15 of its 18 principles. The country comparison was colour-coded as a matrix with three colours, green, yellow or red, where:



- green, indicates that the practice is very much in line with the CoP;
- yellow, indicates that the practice is somewhat in line with the CoP;
- red, indicates that the practice is not in line with the CoP.

The main results are:

- The practice of PROs in Ireland follows the CoP nearly perfectly.
- For PROs from the Netherlands and from Portugal we also obtain only green and yellow fields indicating general alignment with several CoP principles. In Belgium and the UK green and yellow fields clearly dominate over a few red fields indicating non-alignment of PRO practice and the CoP.
- Deviating national practice dominate in Sweden (9 out of 15 principles). Deviating practices appear often in Switzerland (6 principles), Denmark and Finland (4 principles each), though in these countries we also find that practice follows the CoP with regard to several issues.

### Discussion

The discussion on this part was mainly on the country comparison. The question was raised how the different country patterns in regard to the CoP implementation could be reconciled with country comparisons in innovation reports, such as the EU Innovation Union Scoreboard. It should be noted that the CoP and knowledge and technology transfer in general cover only one aspect and that many other factors influence the innovation capacity of a country (not at least the R&D activities of companies). In addition, policy does not necessarily translate directly into performance. As the institutional regressions conducted as part of the Knowledge Transfer Study have shown, the implementation of some of the principles of the CoP is not related to good transfer performance. This could be explained, for instance, with increased levels of awareness and activity in institutions not meeting their goals in knowledge transfer activities.

## 2.2 Interviews with enterprises and KTOs

### Presentation Pieter Perrett

FHNW interviewed 49 **companies** from the industries Biotechnology and Pharmaceuticals, Technology Hardware and Equipment, Software and Computer Services, Automobiles and Parts plus another 11 from the remaining sectors of the European Industrial R&D Investment Scoreboard. On average in 2009, the 60 interviewed companies had a large ratio of R&D expenditure to total sales (R&D-intensity of 12.1% compared to 3.6% for the population of companies in the Industrial R&D Investment Scoreboard) and they invested 83 million euro in R&D. Roughly half of the companies had internal R&D activities at global level, i.e. in Europe and at least two further world regions.

All but one company cooperated with PROs in their home countries, 80% with partners in other European countries and nearly 60% with partners in North America. Companies used both, formal and informal mechanisms. Communication in personal networks, at conferences etc., the recruitment of academics and graduates and the reading and evaluation of scientific publications were the most common *informal* mechanisms. Collaborative and contract R&D were the most common *formal* mechanisms: only three companies (all in the software industry) were not engaged in one or the other. The use of several formal mechanisms is closely related to company size.

We differentiated between nine types of incentives for and barriers to KTT: competence-related, technical, informational, financial, organizational, legal, sociocultural, spatial and other. Competence-related incentives are by far the most important driver to take part in



KTT (mentioned by 9 out of 10 companies). Organizational and sociocultural are the most frequently mentioned barriers across the board. In regard to academic patents technical incentives/barriers related to the outcome of research; the quality and the relevance of the technology were also stressed. Distinct incentives and barriers were mentioned for Europe, the US and Asian countries. Furthermore, incentives and barriers are related to certain characteristics of the companies, above all their size, R&D-intensity, the geographical extension of their internal R&D and the degree of central R&D coordination. We note in particular, that not only SMEs with less than 250 employees, but also medium-sized companies with up to 1000 employees encounter financial barriers.

For different reasons it is a challenging task to evaluate the impact of the European Commission's Code of Practice: 1) the code was issued only three years ago and we would not expect an immediate effect; 2) there are other, not necessarily fully consistent initiatives and policies on IP management and KTT at national or regional levels; 3) the collected data refers only to the current situation and comparable data from the period before the publication of the CoP is not available. Still, we compared the interviewees' experiences with IP management and KTT practices in PROs with the CoP (predominantly principles 8-18 which address KT policies and collaborative and contract research) and looked at the trends and changes to get an understanding of the likely significance of the CoP for KTT. The results can be summarised in three key points:

- The contribution of PROs to innovation is seen as limited.
- The current rules, practices and incentives do not serve the purpose of converting knowledge into socio-economic benefits very well.
- There is no "one-size-fits-all" approach and collecting experiences are important.

A few points of key importance for being successful in the area of knowledge and technology transfer resulted from the **interviews conducted with 100 universities and other PROs**:

- Relationship between KTO funding and staff is crucial.
- While all KTOs collaborate informally with other KTOs, the formal collaboration between PROs in the area of IP and KT is still at an early stage of development.
- Having a written and published licensing policy has advantages as well as disadvantages.
- The majority of PROs perceives that the time required for IP negotiations has increased in recent years. Using model contracts, collecting experiences and developing trust can speed-up contract negotiations.
- KTOs role in transfers not based on IP and patents is a difficult one but nevertheless the importance of such channels should be increased.

## Discussion

In the discussion it was noted that large enterprises typically do not like **model contracts** because they prefer to operate according to their own standards in order to operate efficiently. Universities often like model contracts, while enterprises often do not. Thus, model contracts need to be backed by both PROs and enterprises in order to be helpful in IP negotiations.

Another issue discussed was that many PROs believe they over-emphasise IP protection, considering an open access to IP for companies. Such approaches may raise issues of illegitimate **state aid**; many PROs are afraid of running into related legal difficulties.



### 3 KTO performance surveys (WP2)

#### ***Presentation Nordine Es-Sadki, United Nations University, Maastricht Economic Research Institute on Innovation and Technology (UNU-MERIT)***

Nordine Es-Sadki presented the results of a UNU-MERIT survey on the technology transfer activities of Public Research Organisations (PROs, comprising universities and other public research organisations) in the European Union and twelve Associated States. The objective of the survey was to obtain internationally comparable indicators of knowledge transfer activities by leading European public research organisations. In 2010 valid replies were available for 430 PROs, in 2011 for 498 PROs.

The survey showed that most European Knowledge Transfer Offices (KTOs) are young, with more than half established after year 2000. Furthermore, more than half have fewer than five employees. These results suggest that most KTOs in Europe are still developing experience and capabilities with managing the IP produced by their affiliated university or research institute. Many KTOs could therefore be struggling with a lack of sufficient and experienced staff in catching up with the performance of their peers in the US.

MERIT calculated standardised performance measures for the combined data set by research expenditures and research staff. With the exception of license income, universities outperform other research organisations when research expenditures are used to standardise the results. This should not be surprising, since government and non-profit research institutes have a substantially larger research budget per staff member and are likely to perform more applied research than universities.

Comparing the results internationally, the results show that US PROs require less research expenditures compared to European PROs for invention disclosures, patent applications and license income. While European universities spend €113.5 million to generate €1 million in license income, American public research institutes only spend €24.4 million to generate €1 million in license income. This shows that European PROs are not that effective yet as American PROs when it comes to commercialising research results. Conversely, European PROs are more economically efficient compared to US PROs on the number of start-ups and the number of license agreements.

Out of the 430 respondents that replied to the KTO survey in 2011, 320 responded as well to the survey in 2012. The results show that European universities, who responded to both surveys, performed better in 2011 on invention disclosures, patent application, USPTO patent grants, start-ups established and license agreements.

#### ***Discussion***

The question was raised what reasons may explain the apparent high efficiency of the UK, Ireland and Switzerland in license agreements. One reason may be that these countries have rather well-equipped KTOs, another reason may be strong biomedical research.

As regards the higher efficiency of US PROs in generating licensing income, one needs to consider that the US PROs are quite experienced in licensing already, while European KTOs are still developing their operations and moving up on the learning curve.

It was also noted that the high figures for license income in the Czech Republic and Belgium are due to successful deals of individual organisations.

Overall, there may be many unknown explanations for country differences such as informal contacts between PROs and enterprises, enterprises reading PROs' publications and the like.



## 4 Discussion of key findings from the study

### *Presentation Vivien Baganz (ERAC WG-KT member from Germany)*

Vivien Baganz from the German Federal Ministry of Education and Research discussed the findings of the Knowledge Transfer Study by focusing on the following issues:

Participation in surveys for the Knowledge Transfer Study was and should be **voluntary**. However, this fact does leave a significant blank spot and it is not sure how much it affects the final outcome of the study.

The Communication on the further development of the European Research Area published in July 2012 broadened the priority on knowledge transfer to include open innovation. As the study was commissioned prior to this Communication, it does not explicitly address this issue of **open innovation**. However, quite a bit of interesting information on the collaboration between companies and public research institutions (PROs) can be found therein that directly relates to issues of open innovation.

The study found that PROs put a stronger emphasis on building **KT capacities and skills** rather than developing KT strategies and IP management procedures. It can be suspected that one important reason for this finding is that it is easier to implement training measures, i.e. it requires less resources and is of shorter term. The development and implementation of a comprehensive IP strategy and effective IP management require a long-term commitment of the senior level at PROs and also involve a complex decision-making process as there is no one-size-fits-all approach. In Vivien Baganz' view, even though training is very important, the development and implementation of an IP strategy and effective IP management are the key factors that should be focused on.

It is striking that no correlation was found between the intensity of **national KT policy and KT performance**. The fact that e.g. Sweden and Switzerland have good KT performance but not very sophisticated KT policies could indicate that the size of the population, number of PROs and how well the different actors know each other may play an important role. Mainly though, it needs to be taken into account that the increased focus on IP strategies and policies by PROs in Europe is a relatively recent development so that in a few years from now we may see a correlation between KT policies and KT performance.

The study found that companies and PROs have stated that **negotiations over IP** matters in research collaborations and contract research have become lengthier and more difficult. This does not have to be a bad sign as such, it could only mean that PROs have become more aware of the value of their IP and are less willing than in the past, to give it away (for free). It is of course also possible that PROs – especially if there is no concrete IP strategy in place – will insist on keeping IP that they do not need or will ask for unreasonable prices. It is very difficult to ascertain the value of IP, especially if related negotiations are conducted before the project has started. Over time though, with IP strategies in place, negotiators becoming more sophisticated, and with industry realising that these are arms-length negotiations, this issue should fade away. One needs to take into account, too, that EU state aid rules play a role here. According to the Community Framework for State Aid for Research and Development and Innovation, a PRO transferring IP to a company in a research collaboration risks providing unlawful indirect state aid to the company unless fair market value is paid for such IP.

A surprising fact was that the issue of **uncontrolled loss of know-how** in research collaborations with non-European partners was only raised at the German workshop of the Knowledge Transfer Study. This issue may deserve more attention and a Code of Conduct with respect thereto could be considered.



Despite the amount of progress that undoubtedly has been made, the study shows that there is still a lot of **room for improvement** of PROs' IP capacity and skills in practically all European countries. Even in countries that are more advanced regarding their KT practices (e.g. UK, Germany, Austria, Denmark), further development of IP strategies is needed. The IP Charter is a tool that can be used to develop a comprehensive IP strategy, taking into account that each PRO has to find its own approach and strategy.



## Annex

### Annex 1: List of participants

Nr.	Title	Name	Country / Organisation
1		ARUNDEL, Anthony	MERIT (Netherlands)
2		BABELYTE-LABANAUSKE, Kristina	Lithuania
3		BAGANZ, Vivien	Germany
4	Prof.	BARJAK, Franz	University of Applied Sciences North-Western Switzerland
5	Dr.	BUCHTELA, Georg	Austria
6		EECKHAUT, Stijn	Belgium
7		ES-SADKI, Nordine	MERIT (Netherlands)
8		FOSS, Yngve Joseph	Norway
9		GONZALEZ DE LA RIVERA GRANDAL, D.	Spain
10		GOOSEN, Audrey	European Commission, DG RTD
11		KRATENOVA-VANOVA, Jana	Czech Republic
12		LARIOS SANTOS, Francisco	Spain
13	Dr.	LILISCHKIS, Stefan	Empirica GmbH (Germany)
14		MCCUTCHEON, Patrick	European Commission, DG RTD
15		NOUSIAINEN, Tuomas	European Commission, DG RTD
16	Prof.	PERRETT, Pieter	University of Applied Sciences North-Western Switzerland
17		PIERARD, Frédéric	Belgium
18		RAUD, Taivo	Estonia
19		SHEEHAN, Conor	Ireland
20		STABULNIEKS, Janis	Latvia
21		VILLIS, Rebecca	United Kingdom

**Annex 2: Programme**

<b>Time</b>	<b>Sessions</b>
11.45 – 12.00	<p><b>Welcome and introduction</b></p> <ul style="list-style-type: none"> <li>• <i>By European Commission / chair of the meeting</i></li> </ul>
12.00 – 13.15	<p><b>WP3: Code of Practice implementation and impact</b></p> <p><b>Report on KTO survey</b></p> <ul style="list-style-type: none"> <li>• <i>Prof. Franz Barjak</i> University of Applied Sciences North-Western Switzerland, School of Business (Olten, Switzerland)</li> </ul> <p><i>Discussion</i></p>
13.15 – 14.00	<i>Lunch break</i>
14.00 – 14.30	<p><b>WP3: Code of Practice implementation and impact (continued)</b></p> <p><b>Report on KT interviews with PROs and firms</b></p> <ul style="list-style-type: none"> <li>• <i>Prof. Pieter Perrett</i> University of Applied Sciences North-Western Switzerland, School of Business (Olten, Switzerland)</li> </ul> <p><i>Discussion</i></p>
14.30 – 15.45	<p><b>WP2: Knowledge transfer office survey</b></p> <p><b>Report on performance of KTOs of the top 500 PROs and universities</b></p> <ul style="list-style-type: none"> <li>• <i>Prof. Anthony Arundel / Nordine Es-Sadki</i> Maastricht Economic Research Institute on Innovation and Technology (MERIT), (Maastricht, Netherlands)</li> </ul> <p><i>Discussion</i></p>
15.45 – 16.00	<p><b>Discussion of key findings from the study</b></p> <ul style="list-style-type: none"> <li>• <i>Vivian Baganz</i> Federal Ministry for Education and Research, Germany</li> </ul>
16.00 – 16.05	<p><b>Concluding remarks</b></p> <ul style="list-style-type: none"> <li>• <i>By European Commission / chair of the meeting</i></li> </ul>