



Innovación Educativa

ISSN: 1665-2673

innova@ipn.mx

Instituto Politécnico Nacional

México

Heide, Sjors van der; Sijde, Peter C. van der; Terlouw, Cees
The institutional organisation of knowledge transfer and its implications
Innovación Educativa, vol. 9, núm. 47, abril-junio, 2009, pp. 53-61
Instituto Politécnico Nacional
Distrito Federal, México

Available in: <http://www.redalyc.org/articulo.oa?id=179414895006>

- How to cite
- Complete issue
- More information about this article
- Journal's homepage in redalyc.org

redalyc.org

Scientific Information System

Network of Scientific Journals from Latin America, the Caribbean, Spain and Portugal

Non-profit academic project, developed under the open access initiative

The institutional organisation of knowledge transfer and its implications*

Sjors van der Heide^a
Peter C. van der Sijde^b
Cees Terlouw^c

Abstract

How do European universities organise the knowledge transfer (KT) task? We consider the institutional organisation of knowledge transfer as encompassing 1) the knowledge transfer office structure, i.e. the way universities have embedded and organize their KT activities, 2) the focus towards the KT task, linked to the KT strategy, and 3) the KT activities themselves. Four exploratory cases of European universities show various motives to perform the KT task, different KT strategies and distinct interpretations of KT activities. Hence, the knowledge transfer office does not exist: all have hybrid structures. However, this structure depends on the university's KT strategy. The KT strategy in combination with the KT activities, and not the knowledge transfer office structure as such, is therefore advocated to be the topic of further research.

Keywords

Knowledge transfer (KT), transfer office, institutional organisation.

L'organisation institutionnelle de la connaissance, transfert et ses implications

Résumé

Comment les universités européennes organisent-elles leur mission de transfert de connaissances (TC)? Selon nous, l'organisation institutionnelle du transfert de connaissances couvre 1) la structure administrative du transfert de connaissances, en d'autres termes la façon dont les universités ont intégré et organisé leurs activités de TC, 2) l'objectif qu'elles cherchent à atteindre par le biais de leurs activités de TC, cet objectif orientant leur stratégie de TC, et 3) les activités de TC elles-mêmes. Quatre études de cas portant sur des universités européennes montrent qu'il existe différents moteurs pour la mission de TC, différentes stratégies de TC et enfin différentes interprétations de ce que sont les activités de TC. Il n'existe donc pas de modèle type pour les services de TC: toutes ont en effet une structure hybride. Cette structure dépend cependant de la stratégie mise en place par l'université en matière de TC. Il nous semble donc que l'effort de recherche doit porter avant tout sur cette stratégie, et sur sa mise en pratique (activités de TC), plutôt que sur la structure administrative même du transfert de connaissances.

Mots-clefs

Transfert de la connaissance, structure administrative, l'organisation institutionnelle.

Organización institucional del conocimiento, transmisión e implicaciones

Resumen

¿Cómo organizan las universidades europeas la tarea de transmitir el conocimiento (TC)? Los autores consideran que la organización institucional de la transferencia del conocimiento abarca: 1) la manera en que las universidades han insertado y organizan sus actividades de TC, 2) el enfoque hacia esa tarea, ligada a la estrategia de TC, y 3) las propias actividades de TC. Cuatro estudios de universidades europeas muestran diferentes motivos para realizar tareas de TC, diversas estrategias y distintas interpretaciones de las actividades de TC. De ahí, que no existe una sola instancia para TC: todas las universidades tienen estructuras híbridas. Sin embargo, esta estructura depende de la estrategia que tiene la universidad para TC. La estrategia para la transmisión del conocimiento conjuntamente con las actividades de TC, y no la estructura administrativa para la transferencia del conocimiento como tal, por ello se aboga para que sea tema de mayor investigación.

Palabras clave

Transmitir conocimiento, estructura administrativa, organización institucional.

* van der Heide, Sjors, Peter C. van der Sijde and Cees Terlouw, "The Institutional Organisation of Knowledge Transfer and its Implications", Higher Education Management and Policy, Vol. 20/3. doi: 10.1787/hemp-v20-art22-en.

a Faculty of Management and Governance University of Twente, The Netherlands. E-mail: s.vanderheide@utwente.nl

b Faculty of Management and Governance University of Twente, The Netherlands. E-mail: p.c.vandersijde@utwente.nl

c Faculty of Behavioural Sciences, University of Twente, The Netherlands. E-mail: c.terlouw@utwente.nl.

Introduction

Universities are considered to be a key factor in regional development (Tornatzky *et al.*, 2002; Etzkowitz and Klofsten, 2005). The increasing regional interaction (Etzkowitz and Leydesdorff, 2000) is expressed, for example, in the establishment of business and science parks to foster (knowledge-based) entrepreneurship or active patent portfolio management. Hence, next to the transfer of knowledge through academic education and research activities, a *third university task* arises. In this paper, this third knowledge transfer (KT) task describes the *transfer of know-how, expertise, skills and knowledge from one party to another leading to innovative, profitable or economic improvements for government, organisations and individuals in the private and public sectors and in the wider community* (ProTon, 2006) for mutual benefit (PhilipsKPA, 2006).

Knowledge transfer offices

The various activities comprising this academic third knowledge transfer task are generally expected to be executed and managed by a centralized university department: the knowledge transfer office (KTO). Publications and surveys (ProTon, 2007; AUTM, 2006; ASTP, 2006) on KTOs and KT activities tend to focus on practical issues regarding, for example, the number of patents filed (Saragossi and Van Pottelsberghe de la Potterie, 2003) or staff reward systems (Siegel *et al.*, 2003; Link and Siegel, 2005). Many reports conclude that there is no single model for knowledge transfer offices (e.g. Milken Institute, 2006; Lambert Review, 2003). A recent survey by Decter *et al.* (2007) highlighted significant differences in the United Kingdom and the United States between the motivations of universities to transfer technology, the consistency of university technology transfer policies and the accessibility of university technologies to business. Lockett *et al.* (2003) found that the more successful universities on spin-out activities have a clearer strategy towards these activities. University preferences regarding commercialisation paths and the quality of entrepreneurial support affect the degree to which spin-offs remain within their region (Golob, 2006). Although Golob shows that other factors contribute to this decision too, university behaviour within its regional context is of significant influence. However, what mechanisms comprise this university behaviour? The institutional organisation of knowledge transfer ought to be directly linked to the university strategy (*cf.* Bresser and Millonig, 2003). Therefore, this paper explores the way universities have embedded their KT activities in their organisation. It addresses the following: how do European universities organise the knowledge transfer task? The university strategy towards knowledge transfer is considered and is related to the focus regarding the KT activities carried out. Four exploratory cases of European universities provide empirical data.

The institutional organisation of knowledge transfer

The institutional organisation of knowledge transfer encompasses 1) the knowledge transfer office (KTO) structure, *i.e.* the way universities have embedded and organise their KT activities; 2) the focus towards the knowledge transfer task (or leading motive to perform the KT activities), which is directly linked to the university strategy towards knowledge transfer; 3) the KT activities themselves. Van der Heide *et al.* (2008) demonstrate that universities both differ in the *kind* of KT activities that are carried out as well as choose various approaches as to *how* these activities are carried out. Markman *et al.* (2005) present a study on KTOs in the United States, in which a set of three different organisational structures is identified: *traditional university structure*, *non-profit research foundation* and *for-profit venture extension*. Although Markman *et al.* distinguish three different structures, implicitly is assumed that KTOs are organised as a centralised body. We will put more emphasis on *what* KTOs do and what kind of KT activities are carried out; consequently, a distinct categorisation is preferred. In the ProTon Domain Synthesis Report (ProTon, 2003) different organisational forms of KTOs were inventoried. Among others, the dimensions *centralised – decentralised* and *organised inside – outside the university* were identified. These two dimensions provide a tool to analyse how the knowledge transfer activities are embedded in the organisation. Four organisational types can be distinguished:

1. Centralised organised inside the university – An institution has one central office where all the knowledge transfer activities are managed. The knowledge transfer office is a university department serving the university's interests only. This resembles the *traditional university structure*: an integral department within a university's administrative structure (Markman *et al.*, 2005).
2. Decentralised organised inside the university – Knowledge transfer activities are spread throughout the entire organisation.
3. Centralised organised outside the university – A university has its knowledge transfer activities managed by a separate (university-owned) body, *cf.* the "forprofit private extension" (Markman *et al.*, 2005). According to Markman *et al.*, these for-profit bodies provide the strongest support for new venture creation.
4. Decentralised organised outside the university – This is the case when the university's KT activities are carried out by different bodies outside the university.

Orientating desktop research indicates that the latter ("decentralised and outside") is not common, which makes sense since it is quite complex to have KT activities managed by different external actors. The third KTO structure identified by Markman *et al.* (2005), a separate body outside of the university's administrative structure,

can generally be considered as *centralised and inside*, except if the KTO is both organisationally and physically separated from the university. In that case the *non-profit research foundation* will be treated as *centralised and outside*. Hereupon, the following question is formulated: how are KTOs embedded in the university system, i.e. what is the KTO structure?

Van der Heide *et al.* (2008) have inventoried the KT activities carried out by universities, alongside education and research activities. The ten most mentioned activities of KTOs are summarised in Table 1. Van der Heide *et al.* make a distinction between core KT activities (C), project management activities (P), support activities (S)

and other activities (O). The core activities involve the direct transfer of knowledge. These activities are facilitated by the project management and support activities. The other activities (in Table 1, only "alumni affairs") are sometimes assigned to KTOs. Within the scope of this paper, this categorisation of KT activities serves as a useful tool to assess the KTOs. The leading motive to perform the KT activities, or the focus for these activities, goes along with the university strategy towards knowledge transfer. Therefore, we will subsequently address the university strategy towards knowledge transfer, the university's leading motive or focus to perform KT activities and the KT activities themselves.

Table 1

Shortlist of the ten most mentioned activities of knowledge transfer offices.

	KT activity	Description
C	Spin-off and enterprise creation	<i>University spin-off refers to the creation of a new company established in order to commercially exploit research knowledge created by university researchers (Landry et al., 2006; cf. ProTon, 2003); spin-off is the entrepreneurial route to commercialising knowledge of public research (OECD, 2000), based on both intellectual and non-intellectual property.</i>
C	Patents and licensing	<i>Involve the exploitation of intellectual property. Through patents an institute for higher education can protect its intellectual property and if a patent is granted it can be commercialised through sales of the patent or a license (ProTon, 2003).</i>
C	University-industry networks	<i>The dynamic two-way interaction between 'the actor' university and 'the actor' industry in collaborative networks (Groen and Van der Sijde, 2002); cf. the partnership principle (Chatterton and Goddard, 2000).</i>
C	Continuous professional development (CPD)	<i>CPD comprises the post-initial education programmes aiming at improving the capability and realising the full potential of professionals at work. P International co-operation University co-operation with public and private organisations beyond national borders. P European affairs Management, acquisition and monitoring of European projects and European funding.</i>
S	Grants	<i>Grants are provided by the government or other non-profit organisations to encourage (individual) development or growth in a particular area.</i>
S	National subsidies	<i>National government programmes and policies intended to encourage certain types of research programmes and other specified university activities.</i>
S	Regional subsidies	<i>Regional government programmes and policies intended to encourage certain types of research programmes and other specified university activities.</i>
O	Alumni affairs	<i>Management of alumni contacts.</i>

Source: Van der Heide, Van der Sijde, Terlouw, 2008.

Exploratory cases of four European universities

Participants

Exploratory cases of four different European universities are carried out to provide a perspective on the institutional organisation of knowledge transfer. We have selected universities with different organisational structures. The selection is based on the university's own assessment of the centralised/decentralised-inside/outside categorisation presented in the previous section. The first knowledge transfer office (KTO #1) is located in a technical university, but serves the interests of three regional universities jointly covering all research and education disciplines. Two universities for technical and social sciences have their KT activities located in a centralised office (KTO #2 and #3). The fourth university is a relatively small campus university for technical and social sciences, which has its KT activities distributed throughout its organisation (KTO #4). See Table 3 for some institutional characteristics.

Data gathering instruments

The cases consist of semi-structured interviews with KT stakeholders on different organisational levels. Interviews were conducted with department directors, directors of the incubation facilities, staff of the patent offices and business development managers. The interview protocol consists of questions regarding the university's strategy towards knowledge transfer, the leading motive to perform KT activities, what KT activities are carried out and the approach towards the KT activities. Each interview lasted about one hour. The interviews were held in November and December 2006. Table 2 provides an overview of the number of interviews at each university. Additional analysis of the universities' strategic plans and university policy on knowledge transfer took place afterwards.

Table 2
Number of interviews at each university.

Knowledge transfer office	Number of interviews
KTO #1	8
KTO #2	8
KTO #3	4
KTO #4	5

Source: Own elaboration.

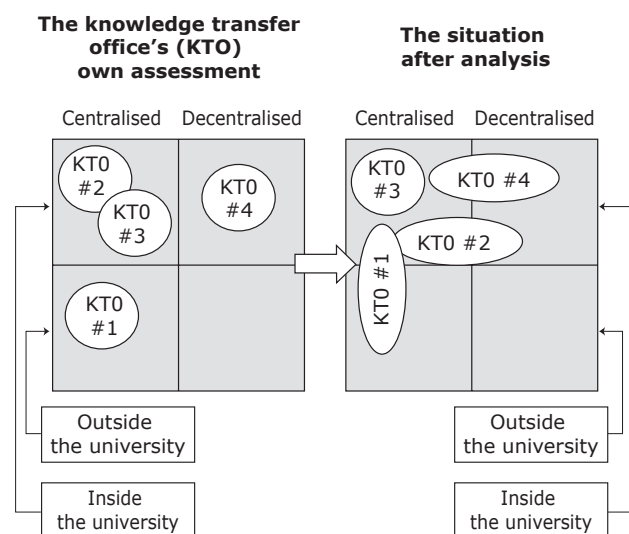
Exploratory case results

Knowledge transfer office structure

The division in different organisational types turned out to be useful for a first categorisation of the universi-

ties. However, in contrast to the prior categorisation, the KTOs do not confine themselves to one quadrant (see Figure 1). KTO #1 carries out a number of KT activities centrally, but collaborates with the individual universities on *patents and licensing* activities and an affiliated incubation facility (*spin-off and enterprise creation*). KTO #2 has a central department for all KT activities, but is now positioning business developers inside the research institutes in order to stimulate closer contact with the researchers. KTO #4 shows a similar, but opposite development. It recently established a central independent "supervisor" in charge of monitoring and facilitating KT activities throughout the organisation. Professional support on legal and financial issues and alumni affairs are managed centrally; all other activities are embedded in the research institutes and faculties. KTO #3 has a co-ordinative role for all activities comprising the KT task. Table 3 provides an overview of the universities' characteristics.

Figure 1
Organisation of KT activities within the university system.



Source: Own elaboration.

Knowledge transfer strategy and leading motive – or focus – to perform KT activities

Each university has a different strategy towards knowledge transfer. KTO #1 is primarily focused on regional economic development. Its region used to be dominated by a few multinational companies playing a central role in the regional industrial activities. However, these companies largely disappeared and the universities leaped into the gap by taking over this catalyst role and by promoting *engagement with industry*. KTO #2's primary role is to support university staff in doing research and attract and secure research funding for them. In addition, they are responsible for developing commercialisation opportunities through *patents and licensing* and

spin-off and enterprise creation activities. The underlying motive is to contribute to regional economic development. The regional role of KTO #3 is illustrated through its mission to assist the university and organisations in creating and strengthening mutually beneficial relationships. The creation and maintenance of *university-industry networks* is therefore the most important KT activity. Besides that, students receive entrepreneurship and creativity training in the early stages of their studies and are involved in projects with (local) industry and new established (high-tech) ventures. KTO #4 primarily focuses on knowledge exploitation. Nevertheless, many projects have a regional aspect. This is encouraged through promoting entrepreneurship and an enterprising culture. In that perspective, it is no surprise that *spin-off and enterprise creation* is the most important KT activity and that less priority is given to *patents and licensing*. The mainly decentralised organisation is considered to be most appropriate to foster an entrepreneurial atmosphere among staff and students.

During the case analyses, one common issue arose: KTOs operate in a dynamic environment. Each KTO experienced many changes during the past five years, and more are yet to come. Tasks and responsibilities have varied over time, mainly due to changing university strategies towards knowledge transfer.

Knowledge transfer activities

The various strategies towards knowledge transfer can also be illustrated by the KT activities. For example, the three university members of the consortium (KTO #1) have their own *patents and licensing* office. The same holds for *spin-off and enterprise creation* activities: the consortium has direct links with an incubator facility; however, except for some central support, the consortium itself is not involved in these activities. This is reflected in the consortium's strategy, which does not focus on knowledge exploitation, for example, but primarily aims at engagement with industry. Albeit alike at first sight, KTO #2 and #3 have a distinct approach of *spin-off and enterprise creation*. KTO #2 is slightly more focused on knowledge exploitation itself, whereas KTO #3 puts more emphasis on its regional benefits. Note that the KTOs give different priority to the various KT activities (see Table 3). For example, KTO #2 is not involved in *continuous professional development* (CPD): it is accommodated in another department of the university, whereas "CPD" is an important activity for KTO #1. Moreover, it can be noticed that, although discussing the same activities, the approach towards the various KT activities can differ substantially among universities. For example, KTO #2 is not in charge of *alumni affairs*, but it carries out *alumni entrepreneurship*, a programme to link entrepreneurial alumni to the university and to consolidate and cultivate this relationship. KTO #4 offers a programme that is comparable to some extent but considers it as one of its *enterprise creation* activities.



Although the approach towards the activities can vary substantially, *spin-off and enterprise creation*, *patents and licensing* and *university-industry networks* are generally considered to be the most important activities (except for KTO #1). Activities such as *national subsidies* and *regional subsidies* are not considered as the most important KT activities. However, in most cases these activities provide the necessary financial resources to support and facilitate (regional) projects.

Conclusions and discussion

This exploratory study underpins the observation that there indeed is no single model for knowledge transfer offices. The knowledge transfer office as such does not exist. All have hybrid structures and operate in an ever-changing, dynamic environment, with both internal and external challenges to deal with. The four cases reveal substantial differences: universities have a distinct strategy and focus towards knowledge transfer. KTOs vary in the number of KT activities carried out, the perceived importance of these activities and the interpretation of the activities. Moreover, universities can label more or less similar KT activities differently.

Implications for practice

The cases show that the organisation of the KT task depends on the university's KT strategy and the regional context. KTO #1 and #3 choose an "outside-in" approach: their strategies primarily focus on – and are influenced by – regional economic development. This is reflected in their central KTO: the central body improves the accessibility of the university for external parties. By contrast, KTO #2 and #4 choose an "inside-out" approach. The decentralised organisation facilitates close contact with the research groups and stimulates knowledge exploitation.

Table 3
Characteristics of the four universities and the knowledge transfer offices (KTOs).

University	#1	#2	#3	#4
University characteristics	The KTO is located in the technical university (engineering and architecture), but serves the interests of three regional universities jointly covering all research and education disciplines.	Campus university with its research and teaching activities organised in four faculties (arts and social sciences, education, engineering, and science) and a business school.	Campus university founded in the seventies. Its research and teaching activities are grouped in three clusters: engineering, science and medicine, and social sciences and humanities.	Small campus university, founded in the early 1960s. It offers education and research in areas ranging from public policy studies and applied physics to biomedical technology.
Number of scientific staff (in full-time equivalent [FTE], 2005)	n.a.	3 456	1 666	1 412
Number of students (in total, 2005)	111 000 (for the three universities)	15 546	13 638	7 673
Number of KT staff (in FTE, 2005)	12 (total) 5 (at the central office) 7 (at the individual universities)	16 (total)	42 (total) 30 (academics) 12 (secretarial)	11 (estimation)
Institutional organisation of KTO	Centralised, outside the university (consortium of three regional universities)	Centralised, inside the university	Centralised, inside the university	Decentralised, inside the university
KTO's year of establishment	1987	1984	1989	1979
"Driving force" behind knowledge transfer activities	University's mission	University's mission	University's mission	University's mission
University strategy towards knowledge transfer	Engagement with industry	Knowledge exchange	To ensure knowledge transfer to the region/ knowledge exploitation. To ensure an enterprising culture within knowledge intensive entrepreneurship.	Enterprising culture; promote entrepreneurship
KT focus (i.e. leading motive to perform KT activities)	Regional (economic) development	Regional (economic) development	Regional (economic) development, knowledge exploitation	Knowledge exploitation

continue...

University	#1	#2	#3	#4
KT activities carried out by the KTO (ranked in order of importance)	1. University-industry networks 2. European affairs 3. Continuous professional development (CPD) 4. Regional subsidies 5. National subsidies 6. International co-operation	1. Spin-off and enterprise creation 2. Patents and licensing 3. University-industry networks 4. Regional subsidies 5. National subsidies 6. European affairs 7. Alumni affairs* 8. International co-operation	1. University-industry networks 2. Spin-off and enterprise creation 3. Patents and licensing 4. Continuous professional development 5. Regional subsidies 6. National subsidies 7. European affairs 8. International co-operation	1. Spin-off and enterprise creation 2. University-industry networks 3. Patents and licensing 4. Continuous professional development 5. Regional subsidies 6. National subsidies 7. Alumni affairs 8. European affairs 9. International co-operation
Remarks	The consortium collaborates with the individual universities on "patents and licensing" activities and an incubation facility (spin-off and enterprise creation).	* Alumni affairs is a separate department that looks after all relationships with alumni, including raising funds and receiving gifts; the KT office primarily looks after alumni entrepreneurship. Another department is in charge of CPD.		Centralised: an independent "supervisor", professional support on legal and financial issues and alumni affairs. All other activities are embedded in the research institutes and faculties.

Source: Own elaboration.

The KTO structure depends to a lesser extent on the university characteristics (e.g. size, number of students); for example, one might expect that KTO #4, as a small university, would bundle its activities in a central office. However, when considering the strategy – encouraging entrepreneurship – the decentralised organisation indeed seems to be more appropriate.

Furthermore, each university carries out the KT activities as identified by Van der Heide *et al.* (2008), but the four core KT activities are not necessarily executed by the KTOs. Hence, the KT task should be considered as a collection of different KT processes, carried out by a variety of actors in a university.

Implications for further research

We suggest two main directions for further research into the institutional organisation of knowledge transfer. Knowledge transfer can be studied from an operational perspective. The operational processes (*i.e.* the various KT activities) in relation to the university strategy are

suggested as units of analysis. This approach offers both a more sophisticated and richer assessment of *best practices* and comparisons, because it provides a context. For example, *spin-off and enterprise creation* can be instigated by a regional development policy (*outside-in*) as well as from a knowledge exploitation policy (*inside-out*). Activities seem the same, but are differently rooted in the organisation and will impact the region accordingly.

Knowledge transfer can also be considered from an organisational perspective. The university strategy towards knowledge transfer determines the way KT activities are organised. The university strategy itself, linked to regional contextual factors and the KT activities, should therefore be a subject of study. A broader study would allow the assessment of the *fit* between the university strategy towards knowledge transfer, the institutional organisation and the way KT activities are carried out. In this constellation the (research) question arises: what is the best way to organise KT activities to reach the intended university objectives? In a separate office (institutional actor: centralised, decentralised or hybrid), or

as functions (individual actor) spread out over a score of people?

The approach chosen by Markman *et al.* (2005) could be useful to repeat in Europe, with a difference. Their theoretical model encompasses common commercialisation strategies and various technology stages at which KTOs get involved in the commercialisation process. A new approach could be to extend the study into the roles that the individual and institutional actors in KT activities play. Obviously, it would be interesting to make a comparison between the European and North American situation, from both the organisational and operational perspective.

Limitations

We believe that the case analyses provide sufficient details to have sketched an impression of the institutional organisation of knowledge transfer. Nevertheless, some remarks have to be made. The exploratory case results are based on a limited number of interviews with persons from various organisational levels. Due to time restrictions, university board members were not interviewed. Additional analysis of strategic plans and university policy on knowledge transfer should largely compensate this lacuna. Furthermore, these four universities are merely indicative, not representative of European universities in general.

Recibido abril 2009
Aceptado junio 2009

Bibliography

ASTP (Association of European Science and Technology Transfer Professionals) (2006), *Final Report: The 2006 ASTP Survey*, ASTP, www.astp.net.

AUTM (The Association of University Technology Managers) (2006), *AUTM US Licensing Survey, FY 2005 Survey Summary*, AUTM, www.autm.org.

Bresser, R.K.F. and K. Millonig (2003), "Institutional Capital: Competitive Advantage in Light of the New Institutionalism in Organisation Theory", *Schmalenbach Business Review*, vol. 55, pp. 220-241.

Chatterton, P. and J. Goddard (2000), "The Response of Higher Education Institutions to Regional Needs", *European Journal of Education*, vol. 35, No. 4, pp. 475-496.

Decter, M., D. Bennett and M. Leseure (2007), "University to Business Technology Transfer – UK and USA Comparisons", *Technovation*, vol. 27, pp. 145-155.

Etzkowitz, H. and M. Klofsten (2005), "The Innovating Region: Toward a Theory of Knowledge-based Regional Development", *R&D Management*, vol. 35, No. 3, pp. 243-255.

Etzkowitz, H and L. Leydesdorff (2000), "The Dynamics of Innovation: From National Systems and 'Mode 2' to a Triple Helix of University-Industry-Government Relations", *Research Policy*, vol. 29, No. 2, pp. 109-123.

Golob, E. (2006), "Capturing the Regional Economic Benefits of University Technology Transfer: A Case Study", *Journal of Technology Transfer*, vol. 31, pp. 685-695.

Groen, A. J. and P.C. van der Sijde (eds.) (2002), *University-Industry Interaction: Examples and Best Practice in the European Union*, Twente University Press, Enschede.

Lambert Review (2003), *Lambert Review of Business-Industry Collaboration*, HM Treasury, London.

Landry, R., N. Amara and I. Rherrad I. (2006), "Why Are Some University Researchers More Likely to Create Spin-offs than Others? Evidence from Canadian Universities", *Research Policy*, vol. 35, N°. 10, pp. 1599-1615.

Link, A.N. and D.S. Siegel (2005), "Generating Science-based Growth: An Econometric Analysis of the Impact of Organisational Incentives on University-Industry Technology Transfer", *The European Journal of Finance*, vol. 11, No. 3, pp. 169-181.

Lockett, A., M. Wright and S. Franklin (2003), "Technology Transfer and Universities' Spin-Out Strategies", *Small Business Economics*, vol. 20, pp. 185-200.

Markman, G.D. et al. (2005), "Entrepreneurship and University-based Technology Transfer", *Journal of Business Venturing*, vol. 20, pp. 241-263.

Milken Institute (2006), *Mind to Market: A Global Analysis of University Biotechnology Transfer and Commercialization*, Santa Monica, California, www.milkeninstitute.org.

OECD (2000), "Industry-Science Relations", OECD Science, Technology and Industry Outlook 2000, OECD, Paris, pp. 161-183.

PhilipsKPA (2006), *Knowledge Transfer and Australian Universities and Publicly Funded Research Agencies*, Department of Education, Science and Training, Australia.

ProTon (2007), *The ProTon Europe 2005 Annual Survey Report*, Report Draft, April.

ProTon (2006), *Annual Report 2006*, Proton Europe, www.protoneurope.org.

ProTon (2003), *Workpackage 7 – Review of the Different Forms of Collaboration between Academia and Industry*, Domain synthesis report, Chapter 6, ProTon Europe, September.

Saragossi, S. and B. van Pottelsberghe de la Potterie (2003), "What Patent Data Reveal about Universities: The Case of Belgium", *Journal of Technology Transfer*, vol. 28, pp. 47-51.

Siegel, D.S., D. Waldman and A. Link (2003), "Assessing the Impact of Organisational Practices on the Relative Productivity of University Technology Transfer Offices: An Exploratory Study", *Research Policy*, vol. 32, No. 1, pp. 27-48.

Tornatzky, L.G., P.G. Waugaman and D.O. Gray (2002), *Innovation U.: New University Roles in a Knowledge Economy*, Southern Growth Policies Board and Southern Technology Council, North Carolina.

Van der Heide, S., P.C. van der Sijde and C. Terlouw (2008), "Exploring 'Transnational' University Cooperation on Knowledge Transfer", submitted.