PROTTEC

ADVANCING INNOVATION AND KNOWLEDGE TRANSFER

Identification of and Improvement to Technology Transfer Best Practice

Work Package 2 - Appendix 3

European Regional Development Fund
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PROTTEC WP2 Appendix 3.0

Summary of case study results (France & UK)

PROTTEC calls for the comparison of knowledge transfer cases, conducted in France and the UK, to see if certain elements of the project, the team, its leader or the company receiving the knowledge (or technology), stand out as factors that are significant to success or act as barriers.

Fifteen technology transfer case studies were undertaken in France by Dominique Philippe Martin, professor at the University of Rennes 1, and Lionel Pujol, technology transfer officer at Bretagne Valorisation.

A similar set of interviews were then undertaken by the University of Exeter as part of its Work Package Two programme. They comprise 15 case studies carried out by the University of Exeter and three additional studies carried out by the University of Plymouth.

1.0 Channels for knowledge transfer

The University of Exeter acknowledges that knowledge, in its various forms, is transferred via different channels and this is an essential element when considering improvements to the knowledge transfer process. Although it recognises that there are numerous channels for knowledge transfer, for the purpose of PROTTEC, the University of Exeter limits its research to the following:

- **patents & licensing**
  Patent: An exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. A patent gives an inventor the right for a limited period to stop others from making, using or selling the invention without the permission of the inventor (Holi, et al, 2008).
  License Agreement: A formal agreement that allows the transfer of technology between two parties, where the owner of the technology (licensor) permits the other party (licensee) to share the rights to use the technology, without fear of a claim of intellectual property infringement brought by the licensor (Holi, et al, 2008).
- **joint ventures**
  A contractual agreement resulting in the formation of an entity between two or more parties to undertake economic activity together. The parties agree to create a new entity by both contributing equity, and they then share in the revenues, profits or losses, expenses, and control of the enterprise (Holi, et al, 2008).
- **contract research & consultancy**
  Contract research: Research arising from collaborative interactions that specifically meets the research needs of the external partners (Holi, et al, 2008).
  Consultancy: The provision of expert advice and work which, while it may involve a degree of analysis, measurement or testing, is crucially dependent on

a high degree of intellectual input from the Higher Education Institution to the client (Commercial or Non-Commercial), but without the creation of new knowledge (although new understanding is the main desired impact) (Holi, et al, 2008).

- **spin-outs**
  From a Higher Education perspective, spin-outs are defined as companies set-up to exploit IP that has originated from within the higher education institute. From a business perspective, a spin-out occurs when a division of a company or organisation becomes an independent business. The newly formed company usually obtains the assets, intellectual property, technology, and/or existing products from the parent organisation (Holi, et al, 2008).
- **joint conference**
  A jointly conceived and hosted event where interested parties are able to attend and review research and/or industrial papers. Joint conferences are usually constrained by a particular subject or theme.
- **professional journal publication**
  The act of publishing novel ideas or outcomes of research and business projects, for example in periodicals such as scholarly journals, newspapers and magazines, or in books and websites. Publications can be peer-reviewed (for example in many academic journals), or not (Holi, et al, 2008).
- **networks**
  A social structure made of nodes (which are generally individuals or organisations such as universities and businesses) that are tied by one or more specific types of interdependency, such as values, visions, ideas, knowledge, technology or financial exchange, or friendship (Holi, et al, 2008).
- **secondment**
  The detachment of a person from their regular organization for temporary assignment elsewhere, for example in industry (Holi, et al, 2008).
- **collaborative research**
  A structured research project that involves two or more partners in addition to the Higher Education Institution, where all parties work together toward a common goal by sharing knowledge, learning and building consensus (Holi, et al, 2008).
- **joint supervision**
  A contractual or informal agreement where two or more parties manage and oversee a person's or project's performance, development and/or operation.

2.0 French case studies

The French PROTTEC case studies cover a range of projects and are led by a variety of project managers. They mainly concentrate on technology transfer and remain in the patents & licensing, collaborative research, contract research & consultancy, and joint venture transfer channels.

2.1 French case studies conclusions

Through a comparison of each case study and the profiles of the project, the team, its leader and the company receiving the technology, Bretagne Valorisation conclude the following:

• The competency profile for project
This profile appears as a central element in the effective capacity to transfer a patent. The 'reticular academic' (Profile 1) present a profile of a 'facilitator' because these people combine academic recognition with the ability to establish relationships of trust with the support structure, but also the ability to develop networks for obtaining research contracts. This result converges with those who emphasise the key role of academics involved in several networks (the 'gatekeepers', see, in particular Murray, 2002). Other types of project (the 'independent academic', the 'technologists' and 'Ivory Tower'), probably because of their skills profile, will initiate differentiated strategies from technology transfer offices (TTOs) to transfer their research.

• The project team profiles
If the skills portfolio of project teams is rather mixed (for example, the distinction between 'collaborative/applicative' and 'independent'), it seems there is convergence between, on the one hand, the profile team that combines expertise in the applicative and collaborative dimensions, and, secondly, the profile of project leaders described as 'reticular academic'. However, this team profile 'application and collaborative' can also be mobilised by 'independent academic', and by 'ivory tower' academic.

• The types of project transferred
The projects are characterised by 'patterns of knowledge' more complex than we usually imagine. Thus, the project of 'archetype 1' is characterised by the existence of a conceptual model and the importance of the share of tacit knowledge, but also by the difficulty of counterfeiting, while remaining understandable by non-specialists. However, in the fifteen cases studied, the majority of different types of 'knowledge configuration' do not play a role in more or less ease of transfer of a patent. One exception, however: the project profile 'archetype 2' – an incremental invention with a relative ease of counterfeiting. One of the five projects in this category was transferred.

Apart from this type of project, the French study concludes that the 'reticular academic' profile associated with a profile of team 'collaborative/applicative' (Profile 1 team) appears as central to the effective capacity to transfer, whatever the type of project.

• Companies interested in patents
Finally, the last dimension, and for the fifteen cases studied, that seems important is the competitive position of companies in their markets. Those who obtain a patent (six cases out of fifteen studied) are well positioned in their markets. They have, again, a R&D team, which appears as an important component in the absorption and use of patents bought (or made under license). The first results of this qualitative study allows for the specification of the factors that can facilitate (or, conversely, make it more difficult) the transfer of patents.

Essentially, Bretagne Valorisation concludes that the competency profile of the project leader appears to be a central element in the effective capacity to transfer a patent along with the profile of the project team. Also, the competitive market position of the interested company, and whether or not it has an R&D department, are significant factors in the successful transfer of knowledge.

Among the limitations of this work, the French findings suggest two elements: the first concerns the relatively small number of cases studies and the second is the collection of data. Bretagne Valorisation notes that: 'In a perspective of 'modelling' (descriptive approach), fifteen cases of technology transfer remains a small number. However, patent licensing is subject to confidentiality clauses and it seems difficult to conduct a quantitative study based solely on questionnaires, that is to say without a precise knowledge not only of actors but also content and context of innovation. The number of cases studied, however, helped to refine the model.

'The second limitation of this work involves the collection of data: it relies on primarily knowledge of the engineer responsible for the licensing of patents studied. However, the knowledge from the engineer is difficult to replace because of the confidential aspect and frequent informal discussions on their projects with researchers, or even when plenary meetings of the committee of expertise, have to cross the assessments made and check relevance.'

2.0 UK case studies

Numerous case study candidates were put forward for the University of Exeter to consider. Upon selection, each of the case studies was allocated a specific knowledge transfer channel depending on the definitions described previously. They comprise:

3 x patents & licensing
2 x joint ventures
1 x contract research
1 x consultancy
3 x spinouts
1 x joint conference
1 x professional journal publication
1 x network
1 x secondment
1 x collaborative research
3 x joint supervisions – including two Knowledge Transfer Partnerships (KTPs) and one Knowledge Transfer Fellowship (KTF)

3.1 UK case studies conclusions

Similar to the findings in France, the UK's case studies show that success depends on a number of factors. The UK studies demonstrate that an experienced project leader is able to drive a project the most effectively, but perhaps most importantly, findings suggest that it is individuals that are the biggest success factors. A case study comment that supports this includes: 'One experienced person guiding throughout the early phases was key to success'.

They demonstrate that success is dependent on identifying the right projects and finding the right people to carry them forward. A sense of enthusiasm seems to also be an essential element, along with a willingness to part with information before trust has been established. 'This is why it is essential to establish face-to-face contacts in advance of initial information requests,' highlights one case study respondent.

Main highlights from the UK case studies include:

- Face-to-face contact is viewed as the biggest single factor to a project's success, whether it is part of an initial consultation at the beginning or during a project, or whether it is as part of the project itself, in the case of a network or conference.

- Face-to-face contact enhances the quality of a relationship between parties, and in some cases, more contact would have ranked the project's success higher. Supporting comments include: 'The need for face-to-face contact and verbal exchange of ideas is essential in every project; it is the foundation to making a project happen'.

- An understanding of tacit knowledge transfer is important and that tacit knowledge transfer happens during the face-to-face contact. Supporting comments include: 'Tacit knowledge was vital and the research required both; if you have tacit knowledge there is more scope to innovate in the long-term'; and 'Some explicit knowledge is needed, but the essence of the project, and its greatest benefit, is the transfer of tacit knowledge'.

- The amount of tacit knowledge transfer depends on the project; projects leaders in engineering-based projects seem to expect, or not wish to have as much tacit knowledge transfer as those in, for example, networks, spin-offs or joint ventures.

- Most teams leaders, from both HEIs and Industry, collaborate with other laboratories and offices positioned in other research areas, and view this as important to success.

- Successful projects seem to have leaders with good links to the university knowledge transfer office.

- Explicit knowledge is often required by the funding organisation as it is the most effective way to measure the success of a project; tacit knowledge transfer is much harder to quantify.

- Success is dependent on a real willingness from all parties.

- Trust and motivation are needed for knowledge transfer, but particularly commercial motivation.

The case studies also identify barriers to knowledge transfer; these include:

- Misunderstanding and disagreement with the university regarding ownership of personal IP generated whilst working for the university
- The university system causes reaction to be much slower than that experienced with the industrial partners
- Unforeseen difficulties in the development path of the technology
- Obtaining funding & venture capital

- Length of time it takes to gain trust
- Time availability; academic in particular
- Lack of commercial experience (university & academic)
- Engaging academics to grow a third revenue stream.

Participants in the case studies also highlight numerous suggestions that would either have improved their particular project, or would improve future ones. Main suggestions include:

- The university should provide clearer information and better advice on IP issues; support was only strengthened as the project's success became evident.

- Fostering interest from academics to set up companies, a 'quick guide' to motivate the first steps for setting up spin-outs would be a useful tool to initiate action.

- Make more time available for face-to-face contact; particularly when working on projects where the partners are not situated locally.

- Set aside more project time for client management and 'care calls'; more time with the client established a relationship, builds up trust and improves understanding between partners.

- Long-term financial commitment and an increase in funding would improve the knowledge transfer process and help to crystallise the development of a product.

- Applying for a government grant could be simplified to encourage SMEs to participate.

- A more centrally-led university approach to industry engagement.

- Commercialise the interface between industry and the university, along with a centralised information system for providing the university with a 'commercial face'.

- Encourage structured secondments – between university and industry and between different universities and research organisations – based on 'true experience', ensuring that the person on the exchange was genuinely interested in it.

- Educate industry about the advantages of working within the university.

- More consistent, specific, targeted help for newly set-up spin-offs to increase their competitiveness.

3.2 Overall conclusions

It is not possible to exactly compare the case studies between France and the UK, because there are too many unknown variables in trying to establish the equivalent profiles that the French case studies use for the different types of leaders, project teams, project technologies and receiving companies. Also, UK case studies consider a broader range of knowledge transfer channels and as a result employ the responses of differing parties within a project. However, a number of factors highlight success in both the French and UK case study projects including the impact that the project leader has on a project.

Findings suggest that successful knowledge transfer is derived from an experienced and motivated project leader, working with enough funding and support from his/her organisation, and transferring knowledge to a company that is open to the experience and has enough business acumen to know what to do with the knowledge once it has been received. Like the French case studies suggest, the receiving company often has an R&D department.

A comparison of all case study findings also suggests that the type of technology (be it proven or emergent) or the type of innovation (be it incremental or radical) being transferred has limited impact on the actual success of the knowledge transfer process.

The case studies strongly demonstrate that there has to be face-to-face contact to make the projects a success. This face-to-face contact is critical in establishing trust and developing a deeper understanding of each partner's needs and expectations. Meeting these expectations seems to ensure the continuing successful and deepening relationship between project partners.

The case studies also show that tacit knowledge transfer is extremely important and happens during the face-to-face contact; however, this transfer is harder to achieve because it takes more effort.

Further research

It would be helpful to be able to draw further comparisons from a broader range of French case studies that also consider knowledge transfer across channels such as networks, secondments, joint conferences and professional journal publications.

References

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Murray, F. (2002) Innovation as co-evolution of scientific and technological networks: exploring tissue engineering, Research Policy, 31: 1389-1403