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Editorial and news bites 2

Knowledge Transfer is not
What it Seems 3

Knowledge Triangle
Activities and Strategies in
the Nordics 4

Catalysing Innovation in the
Knowledge Triangle 5

A Guiding Framework for
Entrepreneurial Universities
in Europe 6

Technopolis Evaluates
Tekes, the Finnish funding
agency for technology and
innovation 7

Group News 8

Editorial

The Evolution of the Knowledge Triangle

Read more on page 2





The knowledge triangle - the flow of added value between research, education and innovation - is emerging as the central concept on the European innovation policy landscape, at the core of the next generation of policies and programmes. The knowledge triangle has gained almost an iconic status in relation to the European Research Area, the new European Institute of Innovation and Technology (EIT) and Horizon 2020.

When first introduced into the European policy debate, the knowledge triangle remained ill-defined as a concept and the difficulty in defining it illustrates the wide variety of experience and practice in linking education, research and innovation throughout Europe.

In a number of our assignments, some introduced in this Technopolitan, we have identified and studied 'real life' examples of 'knowledge triangle' activities, presenting dynamic and effective relationships between the three elements and analysing the practice and showcasing those success factors which might be adopted more widely.

This issue introduces examples in the Nordic Countries

as well as those in the Knowledge and Innovation Communities (KICs) of the European Institute of Innovation and Technology (EIT) where interesting practices have been developed at the crossroads of education, research and innovation. Our assignments on Knowledge Transfer and Entrepreneurial Universities are also at the heart of these three corners of the triangle.

One assignment that we are also proud to present in this issue is the evaluation of the Finnish innovation agency Tekes that we concluded this spring. Tekes has been an exemplary innovation agency for many years and indeed the evaluation shows that consistent government support has helped to make it successful. Nevertheless the Finnish economy is facing challenges at the moment and that means Tekes has had to change direction.

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The knowledge triangle is “the need for improving the impact of investments in the three forms of activity – education, research and innovation – by systemic and continuous interaction”.

(2009/C 302/03)

French Competitiveness Clusters' Evaluation Published

The evaluation report of the French competitiveness clusters policy, conducted in consortium by BearingPoint, Erdyn and Technopolis France, was published on 19 June 2012. The study was contracted by the Directorate General for Competitiveness Industry and Services (DGCIS) and Directorate for Territorial Cohesion and Regional Competitiveness (DATAR).

The evaluation addressed the 2009-2012 implementation period, i.e. the second phase of this major innovation support policy in France (2,7 billions of public expenditures over the period). Its aim was to assess the relevance, coherence, efficiency and impact of the national policy as well as each of the 71 competitiveness clusters.

The study concluded that the policy should be continued over the 2014-2020 period and recommended increasing the leadership role of regions in the governance of the cluster policy, as well as to reinforce the role of clusters and their impact on the SMEs innovation development.

“Competitiveness clusters have played a key role in territorial development and attractiveness. However, national policy – and each cluster’s actions – should focus more on bringing to the market, innovations born from collaborative R&D projects. This can be done particularly by improved mobilisation of the financial engineering tools at their disposal” said Matthieu Lacave, Director Technopolis France

The study’s main conclusions are based on information collected from a wide range of research, business, training and public administrator stakeholders in France, as well as from members of the competitiveness clusters through face-to-face interviews (more than 1600 interviewees) and an online survey (5,500 respondents).

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Knowledge Transfer is not What it Seems

A central feature of the knowledge triangle is the interaction between research and innovation - in particular the link between publicly funded research and the innovation activities of businesses.

Technopolis is just about to complete a piece of work commissioned by STOA, the European Parliament Science Technology Options Assessment which explores knowledge transfer and exchange between researchers and potential users of knowledge in pursuit of technological and economic impact.

The study focuses on the role of public research organisations in innovation in particular the Knowledge Transfer Offices (KTOs) and the mechanisms by which they engage with industry to transfer and exchange knowledge.

While knowledge transfer between the research base (universities and public research institutes) and industry is of course beneficial, an over-focus on this aspect of innovation policy tends to reinforce a number of misconceptions or myths about the innovation process.

Myth 1: innovation is driven by scientific research

Innovation policies promoting knowledge transfer tend to reinforce the concept of innovation as a linear progression from research to technology development to innovative products. While most innovation policy-makers understand that innovation is in fact a much more complex process, this is often lost in the language of policies that instead portray a version of the linear model, where knowledge is either 'pushed' out from the research base or 'pulled' out by industry. As a result, innovation policy over-emphasises the role of publicly funded research, when at heart innovation is primarily a business activity. Businesses decide whether to develop and introduce new products, processes or services and in doing so they are not only influenced by various internal and external factors, but will make use of physical and intellectual inputs from a range of sources, of which, the research base is just one.

The Community Innovation Survey, for example, shows that innovating companies use the public research base as a source of inputs to innovation considerably less frequently than they use other sources such as in-house expertise, customers and suppliers. This is entirely sensible as, except for a few heavily science-based sectors such as pharmaceuticals or electronics, innovation is rarely driven by the latest scientific or high-tech advances, but by new combinations of existing knowledge and technologies.

Myth 2: knowledge transfer is about the exploitation of university-generated intellectual property

Innovation policies focused on increasing knowledge between the research base and industry tend to emphasise the exploitation of formal university-generated intellectual property (IP), patents in particular. In practice, knowledge

transfer occurs in many different ways – hiring graduates, publications, conferences and seminars, consultancy, contract and collaborative R&D – meaning that the exploitation of formal intellectual property is just one route among many. Furthermore studies demonstrate that most businesses view IP exploitation as the least important route to knowledge transfer and, when it does happen, it is rarely undertaken in isolation. Most patent transfers or licence agreements entail additional interactions and collaborative activities to transfer the complex 'tacit' knowledge required to fully understand technology and develop it further. In fact licences are often the result of much longer-term relationships between universities and businesses and IP is licensed to businesses already known to the university or academic inventor. Therefore innovation policy needs to focus on increasing opportunities for businesses to interact with the research base by whatever means possible, and not focus solely on IP.

Myth 3: exploitation of intellectual property is a new source of income for universities

The focus on exploitation of university IP has led to a commonly held view that patent and licence income will become a significant new revenue stream for universities. But, for universities as for businesses, return on investment in risky R&D and innovation

activities is highly skewed with a few investments generating most of the returns. This not only means that a small proportion of university-generated IP will yield high returns but that these returns are more likely to accrue to the universities with the largest research and patent portfolios. As result only a few universities and research institutes are able to derive significant levels of income from IP. Studies in Europe and the US consistently demonstrate that the top 10-20% of universities earn around 80% of all licence income. Therefore exploiting IP will not become a significant source of revenue for most universities.

Acknowledging these misconceptions is not to suggest that there is no room for improvement in university-business links, but that knowledge transfer policy needs to be designed to contribute to a much wider innovation eco-system.

Only a few universities and research institutes are able to derive significant levels of income from IP.

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Knowledge Triangle Activities and Strategies in the Nordics

In 2011 Technopolis Sweden investigated the knowledge triangle activities and strategies in the five Nordic countries, on behalf of the Nordic Council of Ministers. The knowledge triangle was the focus of the 2009 Swedish Presidency although the term still remained at the level of ideas rather than implementation.*

The question of definition was one of the first issues tackled under this contract. The study team revisited the statement of the Competitiveness Council within the EU: “The concept of the knowledge triangle relates to the need for improving the impact of investments in the three forms of activity – education, research and innovation – by systemic and continuous interaction”. With this central definition in mind, Technopolis identified activities and strategies which appeared to contain examples of systemic and continuous interaction between all three parts of the triangle, not those simply focused on education, research and innovation respectively, or on just two of them.

At the concept level, the knowledge triangle was in evidence as a term used in policy and strategy documents only in Sweden. At the time several universities were reorganised with specific reference to the knowledge triangle in their strategies, and the term was frequently in evidence at the level of the universities and colleges, and at a national level, in agencies and in government.

However, Technopolis identified a significant number of activities involving at least two of the three parts of the triangle in all five countries, primarily between education and research or research and innovation. Activities or strategies integrating all three sides of the knowledge triangle were harder to identify and in some of the countries almost non-existent. Yet, there was no absence of aspiration and there were many other ongoing activities in all five countries that

in our opinion embrace the “spirit of the knowledge triangle”. Initiatives did not always refer to the knowledge triangle as a distinct term or clearly integrate all three parts at the same time, but still they aimed at further integration along the lines of the definitions of the knowledge triangle. These activities often targeted two parts and almost three; and with time it may prove that effects have reached the whole triangle.

Technopolis also found examples where initiatives referring to entrepreneurship were highlighted as knowledge triangle activities. Entrepreneurship is a very strong driver of the knowledge triangle in the European literature and it indeed often includes all three parts of the triangle. Pupils in school or students in higher education learn how to turn new knowledge and ideas into innovations, in cooperation with academic researchers and private enterprises.

In Denmark a very comprehensive entrepreneurship agenda has been launched, encompassing the whole education system. We found a similar focus on entrepreneurship in Norway and in Iceland, but with some delimitation compared to Denmark. Although there were strategies and activities fostering entrepreneurship in Finland and in Sweden as well, the focus tended to be on knowledge transfer between academia and industry, and on innovation support structures.

There were very few examples where the whole educational system was included in the activities and they were almost always limited to higher education. In Sweden, it is clearly stated that the knowledge triangle refers explicitly to what is going on in universities and colleges.

We concluded that, while the knowledge triangle may still be a bit of a buzzword, there are many indications that the idea behind the concept is very much alive throughout the Nordic countries, and whatever label is used, we did see a continuous integration between education, research and innovation taking place.

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*The five Nordic countries are: Denmark, Iceland, Finland, Norway and Sweden

Catalysing Innovation in the Knowledge Triangle

A publication on practices from the EIT Knowledge and Innovation Communities by Technopolis Group

The Technopolis Group was commissioned to prepare “Catalysing Innovation in the Knowledge Triangle”, the first ever publication on the approach and activities of the Knowledge and Innovation Communities (KICs) of the European Institute of Innovation and Technology (EIT). Over its lifetime, further publications will continue to chart the development of the EIT and its KICs which were established to animate the relationship between research, education and business. The EIT is new and its mission is aspirational as are the first three KICs, which started their activities in 2010.

The EIT is regarded a model of innovation governance and financing in the European Union. It has been given an important role as part of Horizon 2020, the framework programme for research and innovation for the period 2014-2020, with the objectives of addressing societal challenges.

The publication notes the attention paid to new models of governance in the KICs, seeing them as innovative partnerships which are:

- The first European innovation measure to link all three sides - research, business and education - of the knowledge triangle
- Characterised by a long-term commitment of partners based on trust and a sense of community
- Maintaining flexibility in organisation, management and the degree of partner involvement
- Adopting an entrepreneurial governance and funding model
- Linking regional innovation hubs into trans-European and to global networks

The KICs have a mission to foster innovation and entrepreneurship and to deliver solutions to societal challenges. In fulfilling this mission, they are also bringing about organisational innovation. An important factor in this respect is that the KIC partners are legally and financially committed for a period of 7-15 years. Each KIC has its own legal entity and an appointed CEO who is responsible for the coordination of the KIC strategy and the KIC business plan. An entrepreneurial culture is clearly present, as the KICs must develop a portfolio of assets with market value. KICs are business-oriented entities, but they do not own all the resources with which they work.

The financial model of the EIT Knowledge and Innovation Communities follows an ‘entrepreneurial logic’. While the



EIT provides a seed investment of up to 25% of the total KIC budget, the KICs seek to raise the remaining funds from private sources, from other EU instruments such as FP or the Structural Funds or from income generated by their own activities.

The Co-location Centres as implementing arms of the KICs are fundamental pillars in the architecture and not entities in their own right. The co-location approach creates the environment for the robust governance of the KICs, tapping into the existing provision in Europe’s regions and strengthening the approach through its long-term commitment to collaboration.

The KICs community is experimenting with activities that reduce fragmentation, accelerate innovation and change mindsets. Practices have been established in the areas: ‘education’; ‘innovation’; and ‘entrepreneurship’, which are bundled together into a single package. For example, PhD candidates represent the bulk of the ‘work force’ inside several InnoEnergy projects. They are the people who are driving a significant number of the innovation projects, and they participate in industrial projects of different kind.

The activities are result-oriented and respond to the often-cited concerns about the fragmentation of innovation landscape in Europe. The EIT ICT Master Class programme is the first European-wide ICT Master’s School that is business-driven. As such, it educates a new brand of innovators with entrepreneurial skills and global ambitions. The KIC InnoEnergy’s innovation projects aim to produce tangible outcomes: already, they have filed 11 patents and brought 23 new products to the market in 2011, which means 1 patent per €1m investment.

“Catalysing innovation in the Knowledge Triangle – practices from the EIT Knowledge and Innovation Communities” was published in June 2012 for The EIT by Technopolis Group.

Further information on the publication, or on the EIT and the KICs is available at www.eit.europa.eu

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A Guiding Framework for Entrepreneurial Universities in Europe



Technopolis is currently working with a group of six European experts to devise a “guiding framework” to help European universities become more entrepreneurial. This study for the European Commission, DG Education and Culture is being funded at a time when many universities in Europe are facing more complex and less certain funding structures as well as having to reappraise their market positions, missions, strategies and relationships with staff, students and the external environment. As a consequence, universities are actively seeking external advice and guidance on how to change and become more entrepreneurial. One way of helping institutions is through providing them with a set of “guiding principles” on which to reflect and to open internal dialogue and discussion.

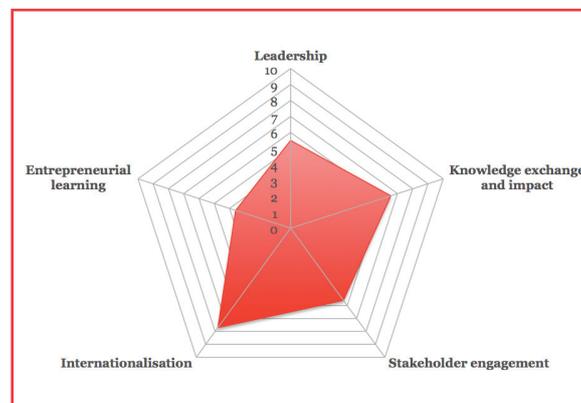
A Technopolis team is half way through this exciting project. The first phase has included a wide-ranging literature review and a pilot of the first draft guiding framework with a selection of over 130 institutions covering all 27 Member States.

The literature review catalogued definitions and concepts of entrepreneurial university systems. What is clear from this work is that there is no single definition of an entrepreneurial institution and there is no one-solution-fits-all due to the great diversity of the higher education sector in Europe. If this guiding framework is to appeal to as many universities in Europe as possible, it needs to be comprehensive and cover different areas for development. The work with the expert group organised the most important concepts from the literature into statements under five main parameters:

- Leadership
- Knowledge exchange and impact
- Stakeholder engagement
- Internationalisation
- Entrepreneurial learning

Under each parameter institutions can assess their current status with the help of a set of statements elaborating on the content of these broad parameters. The results are presented back to the institutions indicating the scores for each of the sections for the purposes of self-reflection while providing the possibility of future follow-up and comparison.

The pilot phase has already highlighted strong support for such a guiding framework within the European higher education sector, suggesting a clear need for this type of guidance for institutions. Change is taking place at all levels of institutions from the leadership down to individual faculties and departments. This guiding framework has the potential to be useful at all these levels and to be used internally to assess approaches taken and levels of development across the five key parameters.



Another key issue arising from the pilot is the use of the guiding framework for self-reflection purposes. Institutions are not looking to judge themselves against the external environment but it is important to create good case materials for guidance and inspiration.

The next phase of the study is to refine the “guiding principles” based on the feedback from the pilot and further input from the expert group. Technopolis will also collect the requisite case materials around the five parameters to showcase different approaches and good practices for motivation. The final framework will be made available to European institutions towards the end of 2012.

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Technopolis evaluates Tekes

On the 6th of June Finnish Minister of Economic Affairs Jyry Häkämies presented the results of the evaluation of Tekes, the Finnish Funding Agency for Technology and Innovation, to an audience of more than 70 Finnish innovation policy stakeholders and the press. The Minister summed up the evaluation by saying “Tekes is performing well and ranks among the world’s leading organisations promoting innovation”.

The evaluation found that Tekes funding has had direct and positive impacts upon innovation in Finland.

- Tekes funding has increased the quality and quantity of firms’ innovation activities, increasing firms’ knowledge capital and generating spillovers. These increase productivity and the rate of innovation
- Tekes funding has triggered innovations that increase growth, support the globalisation of Finnish industry, commercialise products, services and new business processes. It contributes to building networks, cooperations, new research areas and knowledge
- There is evidence that Tekes funding helps increase firm-level productivity and business renewal. Here, however, more study is needed

There are no real (10-20 years) long-term impact studies of Tekes’ activities, but studies of similar programmes abroad and case study evidence from Finland suggest that Tekes also plays a role in the longer term development of some industries (including the forest industry, services and ICT) and has been instrumental in establishing new fields in Finland (eg biomaterials). Tekes funding has not only had effects at the level of individual firms but also in organisational learning and developing new clusters of human capital spanning different organisations, so as to develop the capacity and capabilities of the innovation system.

Four factors help explain Tekes’ success.

1. Tekes is backed by a government that over the past 20 years has consistently made innovation central to its policies and has provided large amounts of funding – more (as percentage of national income) than any other country in Europe – in order to make the Finnish industry competitive
2. The Finnish government does not micro-manage Tekes but maintains it at arms length, giving it the space to be a well respected expert organisation, to interact with stakeholders to define an innovation strategy for Finland together

3. The resulting Tekes programmes have created strategic focus on areas important for Finland and promoted interaction between large companies, SMEs and the Finnish knowledge infrastructure
4. Tekes is a professional organisation, with excellent staff, focused on continuous learning and improvement of its operations

The world is changing constantly, and Finland faces significant challenges, from macro-trends like ageing (Finland has the oldest population in the EU) to micro-trends like the decline of Nokia.

Tekes has taken these developments into account in its new strategy, aiming at renewal of sectors and at supporting start-up and high growth companies operating internationally. The new strategy seems to encompass a sensible shift in portfolio, taking in more risk but without making a complete break with the past.

Although positive, the evaluation sees opportunities for improvement. Tekes should give additional attention to internationalisation of Finnish companies and to its relation with other agencies in Finland (at international, national and regional level). Tekes should simplify its internal organisation and recapture a central role in public debate on innovation in Finland.

The report can be downloaded at:

http://www.tem.fi/files/33176/TEMjul_22_2012_web.pdf

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Group News

News from Sweden

The Swedish office has signed a letter of intent regarding cooperation with the Division of History of Science, Technology and Environment at the Royal Institute of Technology (KTH) in Stockholm. Among the Division's internationally well-renowned researchers is Sverker Sörlin with whom Technopolis has previously collaborated, for example in an evaluation of the Danish GTS research institute system. The main purposes of further developing our co-operation with KTH is to monitor research developments in areas of relevance to our clients and strengthen the consulting teams with top researchers. The cooperation also creates opportunities for internships for KTH students.

News from Germany

The team based in Frankfurt has expanded further with the arrival of Florian Berger who has expertise in STI policy analysis in several sectors of the innovation system. He has worked on R&D policy, Intellectual Property Rights, technology standards as well as on product piracy. Furthermore, he has experience in the Higher Education sector and in Science Policy.



Florian joins from Stifterverband für die Deutsche Wissenschaft, a major funding organisation in the German higher education sector, where he conducted different studies on the German university system.

News from UK

Isabelle Collins (UK Director) has recently left Technopolis to join the evaluation group at the Ministry of Economic Affairs in New Zealand. Isabelle made major contributions to Technopolis and the Group's portfolio of work for the European Commission.



Cristina Rosemberg Montes has joined Technopolis to contribute to the development of the Group's competence in econometric analysis. Prior to joining Technopolis, Cristina worked for BOP Consulting in London, which specialises in the creative industries. During this time she led projects on economic analysis, economic impact evaluation and Intellectual Property. In addition, Cristina has conducted rigorous evaluation of policy interventions in developing countries while working for the Amsterdam Institute of International Development, the World Bank and GRADE (Peru).

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