

Mobilising Transnational Epistemic Communities in a Multi-Level System of Innovation: the Case of the Forest Based Sector Technology Platform

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Abstract

The national innovation systems have been complemented with R&D programmes at the EU level. As part of the 7th Framework Program, the EU has adopted a new policy making tool, called Technology Platforms (TP). The purpose of the paper is to narrate a story of one TP, that of the Forest Based Sector Technology Platform (FTP), and to speculate on its potential consequences. The story of the emergence of the FTP concentrates on the role of institutional entrepreneurs that have been able to orchestrate a transnational mobilisation process. The emerging debate has also made visible gaps in national and transnational modes of operating. Despite the identified gaps there are signs that a Nordic innovation system is emerging in the forest sector with strong organisational linkages to all EU countries. By a Nordic innovation system we mean in this specific sectoral context that collaboration in R&D is not only based on long-term collaborative projects of buyers and sellers of new technological processes but on the a long term commitment of core institutional entrepreneurs to a variety of parallel research programmes at the transnational level. This is backed up by transnational operations and ownership structures of core private Nordic-based R&D organisations. Thus the early steps of a fieldwork based research project on the FTP give new insights of the interrelations of national and transnational R&D policies and the ways in which EU's attempts to introduce experimentalist forms of decentralised governance stimulate integration of national innovation systems at the transnational level.

Introduction

The EU has a strategic intent to create a European Research Area in order to strengthen the economic dynamism in Europe (European Commission 2000). New forms of experimental governance have been initiated, including the use of Open Method of Coordination (OMC). As part of the Framework Program (FP) 7, also a new policy tool called Technology Platform (TP) has been introduced. Its role is to encourage companies, clusters, research institutes as well as national innovation systems as a whole to enter into a European level issue-selling process for defining the content and foci of research programmes. This is to be done through transnational mobilisation of experts and at the later stages of implementation by involving companies, research institutes and universities to European wide research projects.

The purpose of the paper is to narrate a story of one TP, that of the Forest Based Sector Technology Platform (FTP), and to speculate on its potential consequences.

The story of the emergence of the FTP concentrates on the role of institutional entrepreneurs that have been able to orchestrate a transnational mobilisation process. The story makes also visible the fact that the success of launching the FTP has vitalised the national innovation systems of key institutional entrepreneurs. This concerns especially the Finnish and the Swedish institutional contexts. At the same time the ongoing debate has made visible gaps in national and transnational modes of operating. This is due to the prevailing modes of operation and governance of dominant MNCs, key research institutions, universities, and funding bodies. However, despite the identified gaps there are signs that a Nordic innovation system is emerging in the forest sector with strong organisational linkages to all EU countries.

Transnational Nordic collaboration in R&D processes of the forest based industries has for a few decades been based on long-term collaborative projects of buyers and sellers of new technological products and processes. However, by a Nordic sectoral innovation system we make reference to a much denser system of transnational governance and modes of implementing operational projects. Relevant clues of the emergence of a Nordic sectoral innovation system include the following observations. Firstly, the ownership structures of core private Nordic-based sectoral R&D organisations are already transnational. Secondly, the many of the largest forest industry companies are operating transnationally especially in the Nordic countries but also at the European level and even globally. They have also a dense university and research institute linkages as part of their R&D operations. Thirdly, among the core institutional entrepreneurs of the sectoral innovation system a long term commitment of to a variety of parallel research programmes at the Nordic and European levels. For instance, there are already several large-scale EU projects in the forest sector and an informal multi-level governance system that contains the core institutional entrepreneurs¹ from the Nordic countries.

Thus the early steps of this fieldwork based research project on the FTP give new insights of the interrelations of national and transnational R&D policies and the ways in which EU attempts to introduce experimentalist forms of decentralised governance and stimulate integration of national innovation systems at the transnational level. The paradox of the case is related to the fact that research policy is an area of national policy making within the EU and the Technology Platform tool is very weak stimulus for transnational collaboration. Despite this, significant progress has been made to create transnational R&D operations within the forest based industry.

The paper is organised as follows. We will first describe the more general context of the new policy tool. After that we concentrate on the description of the emergence of the FTP. This description is based on interviews of several key actors in charge of the mobilisation of the FTP, on secondary sources, and on participation to national level seminars of experts in Finland (see Appendix). This is followed by sense making of the consequences of the ongoing FTP process at the Nordic level. Such a sense making process is done especially connection with the success and perceived gaps in the current operations. Finally we conclude by arguing that a national business system effect is relatively visible in the new transnational social space triggered by the new governance tool.

¹ Cf. Lilja and Moen 2003: 139-143 on parallel changes in competition policy.

Technology platforms as a tool for experimental governance and as a tool for creating new transnational social spaces

The EU Commission manages its transnational R&D policies and operations through Framework Programs (FP). Program after program, the EU funding has increased. For the Framework Program 6 the Commission allocated 18,5 billion euros, and the budget for the FP 7 is about 54,6 billion euros. The period of FP 7 covers the years from 2007 to 2013 (cordis.europa.eu/FP7/cooperation.html).

The themes and objectives of the Framework Programs are constructed through a multi-level dialogue. Earlier the Commission used for creating a multi-level dialogue a tool called Expression of Interest (EoI). For formulating the FP 7, the EU replaced EoI's with Technology Platforms (TP). Their purpose is to encourage companies to take an active role in the formation of European-wide technology programmes through bottom-up initiatives. Consequently, industry organisations and research institutes have entered into an issue selling and agenda setting game. By the end of the year 2005, 29 TP's have been published in connection with FP 7 (Appendix 2). One of them is the Forest Based Sector TP (FTP). By describing and analysing the emergence of the FTP and speculating on its potential consequences for the European Research Area the specific roles of the national business systems can be made visible.

In the field of R&D, strong international networks have always been highly influential. Thus the pertinent question to ask at this occasion is whether something new is emerging from the issue selling and agenda setting game? Are the R&D directors of the forest based industry able to widen their scope of activities from the MNC to the European Research Area? Do decentralised forms of experimental governance help to handle the widening scope of actors in the formation of search nets (cf. Sabel and Zeitlin 2006)?

The FTP case can be used to illustrate two issues related to the strategic intent to form a European Research Area (ERA). The *first* one concerns the importance of getting complementary resources to the pre-competitive phase of industry-specific innovation processes. The *second* concerns the big gaps that have to be bridged horizontally and vertically in a huge number of disciplinary areas, industrial sectors, and types of operational identities and modes of governance of research institutes, universities and consulting companies. Such gaps can be conceptualised by making reference to paradigmatic differences in disciplinary fields, to long experimental processes needed to converge different technologies into product innovations, to conflict of interests of various types of actors due to their divergent missions, goals and time frames, and to divergent national interests due to different priorities in the economy and the society.

As to the *first* issue, its relevance is highlighted by the fact that companies and states finance 95 percent of all R&D investments in the EU countries. To further emphasise the role of the member states in R&D, the EU has set the target that member countries should increase their R&D investments to 3 percentage of the GNP. As part of the Open Method of Coordination, reaching this target is monitored periodically along a variety of indicators. In 2002, Sweden and Finland had already surpassed this level while some of the largest EU countries, like France, Germany, and the UK were at that time still below the target (OECD 2004). Moreover, in the OECD countries the

share of R&D spending of the private sector is more than 60 percent (Hirshfeld and Schmid 2005:16). For this reason, an active role of private companies is even more important than the role of the states. Thus for making R&D policy a viable instrument for industrial renewal and job creation the involvement of national innovation systems to the EU level is highly important. But in this administrative area, there are greater challenges to overcome than those concerning the amount of funding.

In all countries the R&D sector is highly fragmented and this underlines the second issue: the amount of potential gaps in mobilisation of experts and epistemic communities. At the national level, considerable efforts are invested to create concentrations of knowledge. This is considered necessary in order to get increasing returns from the increasing R&D investments. On the EU level, a parallel process is on the way to facilitate the coordination of the EU level and national programmatic efforts. As a result, a new transnational and multi-level governance system is emerging (cf. Kaiser and Prange 2002; 2004).

If there are difficulties among public policy-makers to adjust to the new needs of transnational R&D operations and innovation policies, the same applies to the private enterprises as well. Traditionally, MNCs kept their R&D operations at their countries-of-origin and then built their exports and foreign direct investments on that strength. Within this system, intellectual property rights have been core assets especially in the high tech industries, and R&D programmes have been implemented under top secrecy (Chesbrough 2003). However, in the science-based industries the feasibility of sheltered company specific innovation pipeline management is being questioned. This question arises from the fact that at an early stage of a discovery process, companies have to opt for several alternative technological solutions and participate with competitors in a large number of research projects. This has highlighted the tension between open and closed models of innovation management (Brown and Hagel III, 2006: 41).

In the search for new science-based industries, catalysed for instance by the development of nanotechnology, the participating role of the public sector is a necessity due to high risks involved. But because the roles of private companies and those of the state and the public sector differ, the tension between market-based coordination and political coordination cannot be avoided. Within the Nordic socio-economic model, states are, however, interested to take a proactive stance to innovation policy and participate in risk sharing because investments to R&D support capability formation of citizens (cf. Salais 2003). Instead of making interventions through the welfare system after citizens have been pushed away from employment the public sector makes such interventions at the knowledge and skill formation phase of an emerging technology, industry and business. In the Nordic countries, the forest and ICT sectors contain many examples of successful public interventions for proactive capability formation.

From a European point of view, the existing variety national innovation systems and their highly diverse priorities as to the specific areas of concentration, is however, a challenge. On the other hand, the new European Research Area is an opportunity for various types of actors to enter into an issue-selling process. The issue-selling process makes visible a variety of potential social spaces. These spaces constitute an opportunity to create transnational epistemic communities. In an open innovation

setting, the issue selling process is much more complicated than within MNCs (cf. Dutton and Ashford 1993; Ling et al. 2003). In an open innovation setting, it is taken for granted that various legal and governance issues are open at the beginning of the mobilisation and that they can (and need) to be solved only if the process moves on. Individual actors and agglomerations of them have to make trade-offs whether to join in, continue in the process, or to step out. Such an explorative process is a laboratory for experimentalist governance.

To illustrate the relevance of the new opportunities and tensions, the experience from the mobilisation of the forest based sector technology platform (FTP) is a case-in-point. It can be used to illustrate the on-going reorientation of multinational forest industry companies in their innovation management. We will do this by restricting us to the paper industry especially. Secondly, the case also highlights the triggering effect of the experimentalist governance approach adopted by the EU for creating the ERA through decentralised mobilisations.

From the closed to open innovation paradigm in the paper industry

The pulp and paper industry has transformed itself radically several times during the last hundred years. The cycles of transformation have been driven by technological inventions that have produced new production processes, facilitated use of new raw materials and led to economies of scale effects. Innovations have occurred in company-specific long-term buyer-seller networks, supported with project assignments to universities and research institutes. Good examples of even radical breakthrough technologies are the innovations for producing bleached sulphate and the transformation from batch pulp making to the continuous boiler. These achievements included joint Norwegian and Swedish resources, and lasted several decades (from the 1930s to the 1980s). Considerable technological inputs were brought also from Germany, the UK and the USA (Moen 1998). New technological platforms required that new mills had to be built. The machine makers have been dominant drivers for this type of technological renewal even though the collaboration with buyers has been important in making incremental improvements in the processes. Defined by statistical indicators, most part of the R&D work has been done by machine makers. However, breakthroughs would not have occurred without the complementary knowledge and experience of buyers. This renewal logic is still viable and used due to competitive advantage based on production factors and market locations. For this reason, new generation mills are constantly being built and old production lines closed down.

With the increased use of chemistry and better process control systems the pulp and paper companies have increased their potential to be on the driver's seat in innovation management. From the early 1990s onwards, paper industry companies have defined their R&D functions to be one of the core activities of the corporation. Such a consideration was based on the idea that new and improved products are strategic assets and the knowledge that is needed to produce them cannot be shared with other companies. For instance, new types of printing and writing papers have been developed in projects that have been managed inside the corporations by relying on a portfolio of network linkages outside. This type of company-specific R&D has also led to inventions of new materials and products that are used in a variety of value

chains, beyond typical uses of paper. However, these steps towards active innovation management were taken within the closed innovation paradigm.

In the paper industry, the awakening towards the open innovation paradigm has occurred only after the prices of the best quality publication papers experienced long slide since the turn of the millennium. Key actors have carefully studied how innovation management is done in other industries, such as ICT and biotechnology. As highlighted especially by the development in the ICT sector, a pre-competitive collaborative context is needed especially for making radical product and service innovations. When such an inference had been made, the opportunities related to the TP instrument started to make sense for many institutional entrepreneurs.

FTP as an outcome and a process

During our fieldwork we have searched answers to two questions: how the FTP has emerged in the forest sector and secondly, when the FTP has turned out as a jointly verified success, what kind of consequences the FTP may have on key actors?

FTP as an outcome

From a factual point of view, the FTP consists of accepted and published documents and of a project organisation that has managed the process. The “vision document” was made public in February 2005 and the “strategic research agenda (SRA) document” a year later. The purpose of the vision document is to communicate to the wider public the role of the forest based sector in Europe, its position in the global economy, its contribution to consumers, and to the economy and the society in the long-term perspective. The SRA document consists of suggestions for research programmes defined by a matrix of value chain phases and potential beneficiary stakeholders. Both documents set the stage for collaborative research efforts for which the EU Commission is allocating funding via Framework Program 7.

The finalisations of the programmatic documents have been major achievements and breakthroughs in the project work launched in 2004. However, a more enduring aspect of the mobilisation is the wide-scale project organisation that has been set up first for getting the documents done, and then for facilitating the implementation of the SRA. The mobilisation has been done by a project management group, assisted by an Advisory Committee (AC) and National Support Groups (NSG). These have been communicating with a Scientific Council (SC). A High Level Group (HLG) has supervised and legitimised the whole organisational construction. The official impetus for the mobilisation has come from three European level interest organisations and their R&D sections. Twenty National Support Groups have been formed for commenting the crafting of the strategic research agenda, and for making preparations for its implementation. As a whole, about one thousand experts have been involved in the preparatory work. Information of this organisational structure and mobilisation is used as a clue in reconstructing steps leading to the immediate empirical outcomes: the two FTP documents.

In the transnational operations of the forest-based sector, the two documents, the available organisational structure of experts and the wider network mobilised to the

work are major achievements.² However, the objectives of the FTP will materialize only if wide mobilisation continues during the implementation phase of the FP 7 and beyond. To prepare for the implementation phase, several transnational conferences have been held, the first one in Austria in May 2006. National level research programmes, adjusted to the SRA, have been made public, the first one in Slovenia and the second in Finland. The project organisation for the FTP has the ambition to coordinate the contents of the national programmes after their publication. This is also necessary in the implementation phase when decisions have to be made on complementary funding for the projects. In Finland, a specialised joint stock company has been founded for the coordination work and for the setting up of research projects. This on-going process has been used as a source of information as to the nature of mobilisations done, for identifying key institutional entrepreneurs and for assessing the status of a Nordic innovation system within the forest-based industrial sector.

Explanatory sediments for the FTP

For accounting for the immediate factual outcome of the FTP, we need to distinguish between several explanatory “sediments” of actors. The first sediment is related to concrete persons who have been working for the FTP. The second sediment is related to European level interest organisations that are the formal hosts of the mobilisation. The third sediment consists of forest industry companies, especially those that have been formed through cross-national mergers and acquisitions. This pertains particularly to Finland and Sweden. The M&A’s have also led to transnational ownership of R&D operations. The fourth sediment relates to broader national innovations systems (NIS). In Europe, these national systems differ as to their linkages with the forest-based sector.

A point to be made is that core persons belonging to the first sediment have been able to link the various sediments together. This has been possible due to their accumulated social capital. Subsequently, they can be regarded as transnational institutional entrepreneurs. They are capable of mobilising capabilities across sectors nationally and internationally, although admittedly the core is largely Nordic. We will illustrate this kind of role through one of the key actors.

Based on several interviews, it is clear that Dr. Lennart Eriksson, the former vice-managing director of STFI³, has been a key person in the process. Already in the mid 1980s, he became involved in EU’s R&D policy activities despite the fact that Sweden was not a member state. From the point of view of R&D in the forest industry, a major breakthrough occurred in relation with the FP 6, according to his observation. Totally 14 000 Expressions of Interest (EoI) were sent to the Commission. In 2001 Eriksson was invited to a meeting where the EoI’s were examined, categorised, and further elaborated. During this process Eriksson observed that in EoI’s there were three areas that were linked with the forest industry. This led to an intensive work process for preparing project proposals, containing representatives from dominant sectoral R&D institutes in Europe. Three consortia were formed for packaging, pulp and paper and for wood products, all having strong link to sustainability. They all got the status of a large EU project (Integrated Project),

² In fact, this is the second mobilisation done by the forest sector to attain the attention of the EU to its role in Europe, since Finland and Sweden joined the EU (see Moen and Lilja 2001).

³ In Sweden, STFI is the core forest sector specific research institute.

with coordinator roles in Sweden, two of them at STFI. Its linkages to the EU research programmes were thus further extended. The other institutes involved with STFI in these projects were the national sectoral institutes from France (CTP), Germany (PTS) and Finland (KCL; VTT). In addition, a large number of university researchers became involved from many countries.

Having been involved with the EoI process in 2001, Eriksson noted that this tool would be replaced with the Technology Platform tool. In 2003, several industry-specific TP proposals were made. Against this background the issue of preparing a forest industry specific TP was taken up at CEPI, the European level interest organisation for the pulp, paper and carton board industry. Eriksson is one of the members of its research section. Besides committing itself to the development of a TP, CEPI made a decision to involve also two other forest related interest organisations in the mobilisation process. These were CEI-Bois, representing the mechanical wood working industry, and CEPF, representing the forest owners. Eriksson took up the assignment to write the TP proposal with the support of Dr. Jan-Erik Levlin from KCL. An expert seminar was organised in Sweden in June 2004 to collect points of view for the research proposal. In July 2004 the TP proposal was sent to the Commission. It became officially listed as a TP. This set the stage for the next wave of mobilisation.

The first task then was to set up an official project organisation. The core working team consisted of C.G. Beckeman, the retiring R&D Director of SCA, as the project director, Dr. Kari Luukko as the project secretary, and Lennart Eriksson as a member. Close to this operation was Dr. Lars Gädda, the R&D Director of M-real, as the chairperson of the Advisory Committee. In addition, a High Level Group, representing the background institutions, and a Scientific Council were set up. The latter contained academics from various disciplines linked with the forest sector and coming from various member countries. The mobilisation included also the founding of National Support Groups (NSG). This organisational structure and the background of persons involved can be used as empirical material for making inferences as to the width and the depth of the mobilisation conducted. Especially, it indicates the role and impact of the European-wide interest organisations and of multinational forest industry companies.

As to the second sediment, the European level interest organisations are represented at the High Level Group through their managing directors. Because the European level interest organisations do not have own R&D experts, the Finnish Forest Industries Federation (FFIF) placed Dr. Kari Luukko at the disposal of the project for one and a half year. At the time of his nomination, he was the secretary of the research section within FFIF. The Austrian Industry Federation made a similar investment by allocating one person to work full time for the FTP launch.

From the third sediment, several forest industry companies have devoted a lot of working time for the mobilisation. As mentioned, the Swedish-based SCA gave its retiring R&D director, C-G. Beckeman leeway to act as top-level diplomat for the mobilisation. At the same time he was the chairman of STFI's board. He negotiated the relations with the different interest organisations, and travelled to member countries for activating the formation of NSGs. SCA had also another person as an Impact Coordinator for consumer products. Lars Gädda, the R&D director of the

Finnish-based M-real, had many roles in the project organisation and in various background organisations, including the board membership of STFI, KCL's Research Policy Section, etc. UPM had a representative through Dr. Markku Karlsson, the Technology Director. He acted as an Impact Coordinator for energy related R&D. In addition to the chair of the HLG, StoraEnso was represented through its R&D Director, Dr. Ilkka Kartovaara. He was the SRA writer of the pulp and paper value chain.

The fourth sediment, containing formal representatives of national innovation systems, brings in the largest number of persons. It should be noted that these come also from other countries than the core actors. To give an example, the representatives of the Value Chain Working Groups for the SRA are classified in Table 1 as to the distribution of countries and background organisations.

Table 1. Distribution of countries and background organisations in Value Chain Working Groups

Countries involved in the SRA work N = 21	Representatives N	Background University n	Background Research Institute n	Background Company n	Background other, or not specified n
Austria	8		4	3	1
Belgium	1				1
Denmark	1			1	
Finland	13		7	4	2
France	9	1	6	2	
Germany	10	2	2	2	4
Ireland	1	1			
Italy	2		1		1
Latvia	2	1	1		
Lithuania	1	1			
Netherlands	2	1	1		
Norway	3			2	1
Poland	5	1	1		
Portugal	2		1	1	
Romania	1				1
Slovakia	1		1		
Slovenia	2	1	1		
Spain	4	2	1		1
Sweden	7		6		1
Switzerland	1				1
UK	1		1	1	

Source: forestplatform.org

Forestry is clearly the value chain phase that has the largest number of representatives and countries, 30 altogether. Thus the width of the mobilisation is partly explained by

the relevance of forests in most European countries. Forests are a source of a sustainable raw material, context for recreation and aesthetic experience. Also the value chain of wood products mobilised experts from many countries.

Consequences of the FTP

As Table 1 demonstrates, the coverage of nations built through the FTP mobilisation is relatively wide. But the FTP signals even a more dramatic break with the past. It is shaped by the road map specified in the SRA.

The positive side

One immediate consequence from the issue-selling initiative is the existence of an organisational network for making proposals for EU research funding. The industry specific R&D institutes are in the first row. They have collaborated for a long time despite competing interests. In this respect the links between STFI, KCL, PTS (Munich) and CTP (Grenoble) are useful. As mentioned, there are on-going joint projects in the FP 6 under the leadership of STFI, and the EU is also funding coordination activities of several research projects under the Woodwisdom ERA-NET operation. These connections have already been used of for the preparation of the FTP.

A major obstacle for having forest industry companies joining projects is that they are not eager to commit themselves to R&D projects that have the objective of developing new products to new types of customers. Such projects are too risky because the machinery, the chemicals, and other scientific knowledge needed for the production processes require a wide mobilisation along the whole value chain. A long-term approach, i. e. beyond the typical 3-5 years innovation pipeline management, is a challenge to R&D functions due to high technical risk. Also during the last five years, forest industry companies have suffered from low profitability due to declining product prices as part of the recession.

On the other hand, long-term collaborative R&D projects are needed for a renewal of the sector. This is also recognized by companies. The strong involvement of the research directors of large multinational forest industry corporations (e.g. SCA, StoraEnso, UPM, M-real) in the preparation of the FTP helps to harmonise the objectives of new long-term projects with company interests. Because the core companies have R&D operations in many countries they can feed into the implementation phase economic and intellectual resources, and act as integrators for new projects. At the same time they are owners of and long-term clients to the sectoral research institutes. There appears to be a shared willingness to reconsider ways through which a pre-competitive joint R&D environment could be created.

A long way to go - indications of gaps

Earlier cross-national comparative research on the use of Open Method of Coordination and the construction of the European Research Area has pointed out that the national and regional specificities in the innovation systems cause considerable friction in the making of mobilisations, in implementing research projects and new innovation policies (Kaiser and Prange 2004). This is also demonstrated by the FTP

initiative. Opposing interests between business and research (academia), differences in national priorities in research have been discussed already earlier. As the previous sections indicate the national representation to the European level mobilisation of the FTP is biased. Representatives from two countries stand out: those from Sweden and Finland. But even within these countries and between them, different organisational principles and governance modes create obstacles for rapid agglomeration of competences. In the Finnish case, a discrepancy has become public between two core actors: those of KCL and the Technical Research Centre of Finland (VTT). Secondly, the transnational discrepancy concerns the different operating modes of KCL and STFI, the core sectoral R&D institutes. We will explicate some of the tensions in this subsection. The open question is whether core actors can gain enough momentum to cut through such hindrances.

In Finland, the two largest R&D organisations focusing on the forest-based industries are KCL and the Technical Research Centre of Finland (VTT). Both have recently reorganised their departmental organisation in order to respond to the needs of different phases of the innovation pipeline. VTT has taken an explicit stance to be an active agent from the strategic research phase to the commercialisation phase of research results. The last phase is extended to the founding of new businesses and in supporting spin-offs from within its organisation and from collaboration-based development work (www.vtt.fi). This process-based organisation is at the same time a blend of matrix and project organisations. This model has enabled VTT to challenge the leading role of KCL in Finland as the largest concentration of experts in the forest based industry. VTT is now claiming that its competence cluster for energy and forest industry hosts 400 specialists organised in seven distinct competence centres, fibre based products being the largest one, with 80 experts. KCL has about 300 experts divided between research, industrial solutions, laboratory services, pilot services, and knowledge applications (www.kcl.fi).

Even though KCL and VTT have a long history of participating in common projects, the ownership structure of KCL causes the main tension. While VTT is fully owned by the state, four forest industry companies own KCL. The research programmes of KCL reflect very much the needs of the owning companies. This is especially reflected in company specific projects ordered by one single company. Even though parts of KCL's funding is allocated to collaborative projects focusing on the pre-competitive phase of the innovation pipeline, KCL is forced to refrain from collaborative projects that may leak some of the knowledge created in company specific projects. VTT on the other hand, is serving all customers willing to buy its services and in this way is neutral as to the source of demand.

The difference with the open and the partially closed operating modes would not have been highlighted if not the same issue had not been raised by STFI (www.stfi-packforsk.se/). In fact STFI has undergone a major reorganisation of its operations already earlier. Its operation mode is based on strategic research programmes. Specific projects are launched when a consortium of clients is willing to finance them for three years. Being an owner is not a prerequisite for being a member of a consortium. This has increased their client base considerably. Moreover, it has about 30 owners, one of them being the Swedish state with a 20 percent minority share. The merger with Packforsk has widened STFI's competences. Packforsk was another Swedish-based research company, specialised in R&D for packaging. In February

2004 STFI-Packforsk bought a 95 percent ownership share of the Norwegian sector specific R&D institute, PFI, located in Trondheim. Through PFIs professional connections with Norway's technical university STFI-Packforsk Ltd. is actually a twin country operation.

The different operating modes of STFI and KCL have also caused friction in previous research projects. KCL has withdrawn from some of them with the motive of hoarding its exclusive knowledge to its owner companies, and subsequently avoiding spill over to other companies like for example the Norwegian-based Norske Skog.

These examples of discrepancies both at the national and transnational levels among concentrations of R&D competence illustrate thresholds that have to be overcome when open R&D ecosystems are mobilised.

Conclusions

In the pulp and paper industry, radical innovations in production processes require convergence of technologies between various industries and along a very long value chain. The orchestration of such innovation processes is not possible from a single company that is the first customer for a radical technological breakthrough. Neither can the competitive advantage from the new system be sustainable because the developers will soon sell it to competitors. Similar dilemmas exist between the company and its potential customers in downstream value chains, especially if radically new products for new customers are in the focus. Forest industry companies are thus facing a similar situation that the ICT companies confronted when the sector anticipated the launch of the 3G operator services. A core company could choose to concentrate on a product development project that was supposed to lead to a superior innovation and to a first mover advantage where the winner takes it all. The other choice was to share the knowledge with a wide network of companies and co-evolve with developer ecosystems. For instance, in 2001 Nokia made the source code of a new software product developed for its 3G handset available through a relatively inexpensive licence. This was done in order to facilitate development of complementary services and thus the expansion of markets and demand for 3G handsets (see Moen and Lilja 2005: 365). Now, after several years, this risk taking has paid off.

The FTP has through its Strategic Research Agenda and organisational and expert linkages pushed the forest-based sector a significant step towards an open innovation paradigm. Despite the frictions between the operating modes of the core concentration of R&D competence in the Nordic countries, there are several sediments of actions where the Nordic R&D collaboration is not based on personal relations and single projects only. The main linkage comes from the transnational R&D functions of the MNCs. This is complemented with joint ownership of several sectoral R&D companies. These are also core actors in the existing EU-projects. The R&D directors of multinational forest industry corporations take care of the governance of the sectoral R&D institutes and at the same time they are leading the R&D section of CEPI, the European level interests organisation. Thus the FTP has been launched to a great extent due to the strengthened ties within the Nordic innovation system of the forest sector. At the same time the organisational linkages created through the FTP

and the ensuing research projects will widen the existing links especially within the Nordic innovation system.

As to the steps taken for a multi-level experimentalist governance system in the EU, we have demonstrated a relatively strong national business system effect. Because the forest-based industrial sector has a global centre of gravity in Finland, Sweden, and Norway it is probable that a Nordic forest sector innovation system can trigger wide-scale transnational R&D operations in the EU. The more bureaucratic a scientific field is the more the attribution of reputation goes to institutes and networks of excellence as a whole. Even though this creates tensions between institutes it also opens up a debate that can be used for searching partners and for framing the unframed context of a potential innovation. Entering into such a debate is also a way to discover a joint research agenda and for forming transnational epistemic communities.

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<http://forestplatform.org>

www.kcl.fi

www.vtt.fi

www.stfi-packforsk.se

Appendix 1

List of interviews, discussions and participation to national mobilisations directly related to the FTP initiative

Georg Carlberg (Norske Skog, research director, leader of the Norwegian Support Group), 1 June 2006, Oslo.

Lennart Eriksson (STFI, FTP project management), 28 March 2006, Stockholm

Lars Gädda (M-real; Chair of the FTP Advisory Committee, 15 February 2006, Espoo.

Christine Haglund-Näsi (TEKES, Finland, member of the FTP Advisory Committee, Coordinator for the Woodwisdom ERA-NET EU project), 24 April 2006, Helsinki.

Kimmo Kalela (former Senior Executive Vice President, Strategy and Business Development, at StoraEnso; former Chair of Finnish Paper Engineers' Association), 13 February, 2006, Helsinki.

Ilkka Kartovaara (StoraEnso, Director of R&D, responsible for the pulp and paper value chain) 20 February 2006, Helsinki.

Kari Luukko (FFIF, the Project Secretary of FTP), 16 March 2006, Helsinki.

Kaarlo Niskanen (KCL, Director Paper Science and Consulting; Managing Director since February 2007), 24 October, 2006,

Catarina Ottestam (STFI), Coordinator for Eco-Target EU project, 28 March 2006, Stockholm

Phillip André Reme (CEO at PFI, and secretary of the Norwegian Support Group), 7 April 2006.

Kari Lilja, participant to the Finnish workshops of experts for creating the vision document (24 November 2004), for informing about the SRA (9 February 2006), on the preparations of the national research programme aligned with the SRA (5 June 2006), making the SRA public in Finland (5 October, 2006).

Other fieldwork of the R&D operations of the forest sector

All authors

Appendix 2

Technology platforms listed by the EU Commission

1. The European Hydrogen and Fuel Cell Technology Platform (HFP)
2. ENIAC - European Nanoelectronics Initiative Advisory Council
3. NanoMedicine - Nanotechnologies for Medical Applications
4. Plants for the Future
5. Water Supply and Sanitation Technology Platform (WSSTP)
6. The European Technology Platform on Photovoltaics
7. Technology Platform on Sustainable Chemistry
8. Forest Based Sector Technology Platform
9. European Technology Platform for Global Animal Health (GAH)
10. ERTRAC European Road Transport Research Advisory Council
11. ERRAC European Rail Research Advisory Council
12. WATERBORNE Technology Platform
(Supported by ACMARE Advisory Council).
13. The Mobile and Wireless Communications Technology Platform (eMobility)
14. Innovative Medicines for Europe
15. Embedded Systems (ARTEMIS)
16. ACARE - Advisory Council for Aeronautics Research in Europe
17. The European Space Technology Platform (ESTP)
18. ESTEP - The European Steel Technology Platform
19. The European Technology Platform for the Future of Textiles and Clothing (ETP-FTC)
20. MANUFUTURE - Platform on Future Manufacturing Technologies
21. The European Construction Technology Platform (ECTP)
22. EuMaT - European Technology Platform for Advanced Engineering Materials and Technologies
23. The European Technology Platform on Industrial Safety
24. The NEM Initiative - European Initiative on NETWORKED and ELECTRONIC MEDIA

25. Food European Technology Platform "Food for Life"
26. Networked European Software and Services Initiative (NESSI)
27. EUROP, the European Robotics Platform
28. Photonics21 - The Photonics Technology Platform
29. The Integral Satcom Initiative (ISI)