Workpackage number: WP 3.4			**Start date or starting event:** month 10					
Workpackage title: *Cognitive Flexibility and Network Alignment in Innovation Systems*								
Participant id:	SPRU	CEE	IWH	IER	UTN			
Person-months per participant:	11	14	1	2	2			

Objectives:

The overarching objective is to analyse network alignment in innovation systems to institute new forms of knowledge creation between the different agents of knowledge creation, dissemination, and use to harness latent knowledge-based capabilities. Particular attention will be paid to the reconstruction of 'regional' and 'national systems of innovation' (or even 'cross-border innovation systems') in CEE countries.

1 The first objective is to scrutinize: *(i)* which are the typical characteristics of processes of knowledge creation in complex structures of collaboration, knowledge application and diffusion *(ii)* how does 'knowledge governance' impact on cognitive flexibility when knowledge actors with heterogeneous knowledge bases, attitudes, norms and values interact, *(iii)* which particular network arrangements and network management techniques enhance cognitive flexibility and the ability to create, apply, and diffuse knowledge, and *(iv)* to which extent is it possible to standardise policy instruments targeting cognitive flexibility, knowledge production and diffusion.

2 The second objective is: *(i)* to investigate governance structures, incentive mechanisms, technological trajectories and knowledge bases that prevent proper use of domestic facilities for 'absorptive capacity' through 'network failures', *(ii)* to detect network misalignments i.e. missing, anti-developmental or mutually inconsistent networks, *(iii)* to identify the weakest link in the respective 'regional' and 'national innovation systems', and *(iv)* to develop country- and sector-specific insights as to how policy makers at various government levels can contribute to fostering 'good' (i.e. pro-developmental) network interactions.

Description of work:

1 The research team develops a network analysis method on the basis of a case study approach applying deep-level expert interviews and other survey techniques, as well as agent-based computational techniques. This is applied to a particular region between Italy, Austria, and Slovenia under participation of the project partners in the respective countries. Surveys and interviews are targeted at the main proponents involved in innovation networks, including clusters, entrepreneurs, RTD centres, universities, as well as local and regional government and administrative bodies.

The main task will be to identify the key drivers as well as the main barriers towards collaborative knowledge creation in cross-border innovation systems. The research team will develop an evidence-based methodology based on the assumption that the ability for collaborative knowledge creation and utilization is shaped by formal structures as well as by informal attitudes, beliefs and values. A particular point of interest will be the so-called "cognitive flexibility", i.e. the ability to detach from local and/or national paradigms in order to develop generic perception and awareness of superordinate knowledge patterns. Here, cognitive flexibility is understood as a challenge for both, individual actors and organizational sets of actors such as companies, research organizations, innovation centres etc.

Network analysis techniques will be applied to identify the mutual perception of actors and their actual governance of exchange of knowledge as well as their collaborative strategies for knowledge creation. Thus, the characteristics of the actual patterns of knowledge processes will be determined and, hence, an assessment of the key drivers and obstacles towards collaborative planning and organization of knowledge creation as well as the diffusion and dissemination of innovative strategies, products and knowledge.

As innovation systems are often embedded in respectively linked to local and/or regional policy systems, the relationships of economic innovation systems with governmental structures will be scrutinized, for

there are numerous initiatives to strengthen collaborative innovation systems (e.g. the Interreg programme), however there is little insight how to ensure added value, the outcomes and the sustainability impacts of these initiatives and there no standardized management techniques in terms of new intellectual technologies for planning, implementing and monitoring which can serve as a general framework for collaborative innovation governance.

To this end, a combination of network analysis techniques will be designed and adopted in a three-level research programme based on expert interviews in the first step, an online survey (supplemented by telephone interviews) in a second step, and finally the application of agent-based computational techniques. The last step is particularly useful as methodological approach whenever the model proves to be analytically intractable, due for example to individual strong heterogeneity and complex interactions. Thus, results from survey and interviews will be employed to provide both descriptive and predictive output validation for simulation outcomes. The agent-based model will be further used as a computational laboratory to study the role of institutions and market/non-market arrangements in fostering knowledge transmission and in driving the endogenous formation and evolution of clusters.

This field work delivers first hand qualitative information in order to shed more light on the relationship between cognitive flexibility and individual/collective thinking, knowledge governance structures, particular network arrangements and management techniques, as well as existing policy instruments. This novel approach adds value to the project as it focuses on the cognitive aspects of knowledge creation and diffusion in a regional/local context.

2 Past comparative studies suggest that network alignment has been a key ingredient for economic growth in some East Asian countries. Building on this experience, the present proposal undertakes comparative studies looking at a representative selection of European countries, but particular emphasis is placed on representatives of new EU Member-Countries (Estonia, Slovenia, Czech Republic) and accession countries (Romania). This allows us to reflect the diversity and uniqueness of national innovation systems in the enlarged EU. For these countries, the research team analyses the characteristics of resource, functional, and spatial networks from the perspective of the enterprise, education, and government spheres. Not only does the information of those three perspectives sum up to a comprehensive view on knowledge and innovation processes, but the combination of the three will culminate into a network alignment perspective in a holistic manner. The analysis draws in particular from all relevant firm-, industry-, and sector-level evidence from all other in section 1, this includes information generated in WP 1.1 (namely the determinants of innovation process and firm performance; foreign vs domestic firms in the innovation process), in WP 1.2 (namely evidence on outward/inward FDI effects; MNC strategy and absorptive capacity in technology transfer, FDI policy), as well as evidence from WP 1.3 (properties of knowledge and resulting incentive-structures). The enterprise-perspective is then augmented with evidence from the public science sector in WP 2.1 (namely organisational conditions/outcomes of science-industry link) and WP 2.2 (with regard to entrepreneurial education). With respect to the policy arena, the research team can draw information from WP 2.3 (namely on perceptions of knowledge and policymaking in education and innovation). The network alignment analysis draws as well from information in the rest of section in particular on skills (WP 3.1), IPR (WP 3.2), and socio-cultural attitudes (3.3). The evidence is scrutinised in a way to identify network misalignments and the weakest links in the respective 'regional' and 'national innovation systems'. These can be used to develop country- and sector-specific policy scenarios in support of the Lisbon-objectives of a European Knowledge Based Society.

Deliverables:

D32 *Workshop aiming at the development of a comprehensive set of network analysis techniques.* Responsible: SPRU (month 9)

D33 *Report on network analysis in a regional perspective*. Responsible: D. Paier (CEE) (month 32)

- CEE: Summary of State-of-the-Art in researching regional network analysis (month 32)
- CEE: Network analysis methodology (month 12)

- CEE: Knowledge production patterns in the Euroregion Austria, Slovenia, and Italy and techniques for the improvement of cognitive flexibility and the management of cross-border knowledge processes (month 32)
- CEE: Newsletters to stakeholders (starting month 25)

D34 *Policy-briefing on the EuroRegion.* Responsible: CEE, IER, UTN (month 32-36)

D35 *Report on network misalignment in selected regional, sectoral, and national innovation systems.* Responsible: N. von Tunzelmann (SPRU) (month 32)

- SPRU: Summary of State-of-the-Art in Researching network alignment (month 32)
- SPRU, IWH: Detecting network misalignments and weakest links in the respective 'regional' and 'national innovation systems' (month 24)
- SPRU: Synthesis identifying mismatches between knowledge creation, production and dissemination in the EU, with special reference to CEE countries (month 32)
- CEE and SPRU: Developing a matrix of knowledge patterns for comparison of different European innovation systems (month 32)

D36 *Policy-briefings at EU level* (EcFin, BRUEGEL institute or similar). Responsible: CEE, SPRU (month 32-36)

Milestones and expected result:

14 Understanding the role of cognitive flexibility an developing the intellectual management techniques in regional innovation systems

15 Network misalignments, i.e. missing, anti-developmental or mutually inconsistent networks, and weakest links in the respective 'regional' and 'national innovation systems'