

Workpackage number: WP 1.1		Start date or starting event: month 2					
Workpackage title: <i>The Determinants of the Innovation Process of Firms</i>							
Participant id:	IWH	IER	NIFU-STEP	SPRU	UoT		
Person-months per participant:	4	6	8	3	22		

Objectives:

The overarching objective is to increase our understanding of the relative impact of internal and external determinants on knowledge creation in the enterprise sphere and the effects of knowledge creation on firms' competitiveness. Knowledge creation is here exemplified by the innovation process at the firm level and represents the interface between firms' own creativity, their contacts with externally structured networks, and their 'absorptive capacity'. The factors underlying this innovation processes are scope, intensity, and knowledge content/character and are mapped from a sectoral as well as country perspective as a prologue to the differentiation of networks.

- 1 The first objective is to analyse determinants of innovation in its three categories with a comprehensive list of determinants that goes beyond the current state-of-the-art. The analysis will determine the relative importance of each of the determinants for each of the three categories.
- 2 The second objective is to link the factors underlying the innovation process (scope, intensity, and knowledge content/character) with firms' performance, in order to assess how much the effect of innovation on the firms' performance depends on (a) the respective factors underlying the innovation process, and (b) on the individual internal and external innovation determinants.
- 3 The third objective is to map national and sectoral differences in the innovation process and their impact on firm performance, with a particular focus on a comparison between countries of Southern Europe, EU-15, and CEE, as well as knowledge intensive sectors.

Description of work:

Work in this workpackage is mainly rooted in data-analysis using modern technologies of mathematical, statistical, and probability tests and estimations. To harness the diversity of firms' knowledge creation, the analysis uses firms' innovation output as a proxy, and characterises it according to the three most important criteria: (i) innovation scope consists of innovative products, processes, and organisational changes), (ii) innovation intensity is measured by appropriate innovation output proxies, and (iii) the knowledge content/character of innovation is differentiated into private or public, into marketable and patentable, as well as narrative, codified or tacit knowledge, etc.

- 1 For the first objective, the Community Innovation Surveys (CIS) serve as the main sources for innovation determinants (key drivers and obstacles) and indicators. The surveys were conducted in several waves (I,II,III) and allow not only for a time-perspective in the analysis, but also to assess a comprehensive list of innovation determinants. By use of appropriate proxies, the surveys allow us to include factors (i) internal to the firms (such as human capital endowment, absorptive capacity, intra-mural R&D, FDI presence, existing technological level), as well as (ii) external factors embracing (iia) direct knowledge transfer effects (such as via foreign direct investment, (FDI) licensing, imports of capital equipment), and embracing (ii) indirect knowledge transfer effects (such as spillovers from FDI, learning-by-exporting, and information sources), and finally (iic) effects of policies (support from local, regional, central or EU authorities) and IPR regimes (formal and informal methods). By the use of econometric data-analysis, all determinants are assessed in an integrative approach, which allows us to derive the relative importance of each determinant, groups of determinants, and interactions between determinants in the context of relevant actor networks. The analysis is comparative in as much as it employs sectoral and country perspectives, covering a representative sample of countries in the enlarged EU.
- 2 Innovations are amongst the most important drivers of competitiveness of firms. Hence, for the second objective, we add the firm performance perspective and relate this over time (a) to the respective factors underlying the innovation process and (b) to the above exemplified internal and external innovation

determinants, at both the individual and collective/networked level. Amongst the performance indicators we envisage in particular (total factor) productivity growth and export performance. For this, we integrate the CISs with national databases of financial data from individual firms for a representative sample of countries in the enlarged EU. This integration can (and has already been done by some of the project's participants) by matching individual firm characteristics from both databases. It has, however, not yet been done for the most recent survey CIS III, nor have the surveys been linked to measure the changes in the relation between innovation processes and performance over time or in a country-comparative manner. This integration will inform us about which innovation determinants influence most intensively firms' performances, depending on country- and sectoral characteristics and can indicate possible network misalignments in the respective national innovation systems. Hence, our results have particular relevance for the targeting of effective innovation policies both at national and European levels.

- 3 For the third objective, the characteristics of innovation processes across countries and sectors are compared to find common features within groups and systematic differences between the same groups. This leads to a mapping of countries/sectors according to their respective innovation processes. We expect to find substantial differences between the sets of regional groupings (e.g. accession countries of southern Europe vs. those of eastern Europe) in the kinds of 'network failures' experienced in innovation processes.

Deliverables:

- D4 *Report on determinants of the innovation process.* Responsible: Mark Knell (NIFU-STEP) (month 20)
- NIFU-STEP: The State-of-the-Art in Researching Determinants of Innovation
 - IER, NIFU-STEP, IWH: Analyzing the relevant determinants of the innovation process in firms: country-specific, sector-specific, panel (also as input for WP 3.2 and 3.4) (month 9)
 - UoT: Mapping country- and sector groups with common characteristics in their innovation processes (also as input for WP 3.5) (month 9)
 - IER, NIFU-STEP: Analyzing the impact of innovation determinants on firm performance: country-specific, sector-specific, owner-specific, panel (also as input for WP 3.2 and WP 3.4) (month 20)
 - UoT: The role of high-tech industries in enhancing innovativeness of resource-based industries (to be linked to WP 1.3) (month 20)
 - UoT, IWH: Focusing on the human capital and skills related determinants of innovation (also as input for WP 3.1) (month 20)
 - UoT: The role of knowledge content/character (in particular tacit vs codified, private vs public, etc.) in the innovation process (month 20)
- D5 *Policy-paper from evidence generated in this workpackage in regard to innovation policies* (also as input for WP 1.2 and WP 3.5) Responsible: NIFU-STEP, SPRU (month 24)
- D6 *Policy-briefing: Innovation Process in the Firm.* Responsible: NIFU-STEP, SPRU (month 24)

Milestones and expected results:

- 2 Mechanisms of knowledge creation within the innovation process of firms
- 3 Human capital requirement of firms to excel in their innovation process