The KEI Project

In the context of the Sixth Framework Programme of the European Commission, the project KEI (Knowledge Economy Indicators: Development of Innovative and Reliable Indicator Systems) started in September 2004. The KEI project is part of the Policy Orientated Research section of the specific programme Integrating and Strengthening the European Research Area.

The project's aim is to develop and improve indicators for the knowledge economy, including the analysis of aggregation issues and the use of composite indicators. The project will cover indicators from 30 European countries (the EU-25 plus Iceland, Norway, Switzerland, Romania, and Bulgaria) and six non-European countries (the US, Japan, India, China, Australia and Canada).

The KEI project will review existing concepts and definitions of the knowledge-based economy and its key components. It will develop main thematic areas in relation to the Lisbon and Barcelona objectives. KEI will then use these themes to classify existing indicators and thoroughly explore data and indicator quality issues. Gaps will be identified and the way forward will be mapped, identifying innovative approaches to improve the understanding and appraisal of the knowledge economy. Composite indicators will be analysed in detail using both statistical and participatory approaches, including the use of multi-criteria methods, aggregation and weighting techniques, decomposition methods, and an evaluation of analytical and presentational techniques. Simulation methods will be extensively employed to investigate the robustness of indicators and the conclusions based on them. The study will evaluate the quality and accuracy of indicators and the underlying data and assess the innovative use of additional information to improve indicator quality.

The state-of-the-art analysis, as provided by KEI for the knowledge-based economy, will benefit other policy objectives of the European Union and Commission Services. It will contribute to a methodological framework for building effective measurements of interdisciplinary issues such as sustainability, employment, social cohesion, and economic disparities. KEI will also make recommendations for the design and use of statistical reference systems.

Workshops

KEI will organise five workshops covering specialised project topics. External experts will be invited to complement KEI research activities. The first workshop will take place in Tübingen in March 2005. Subsequent seminars will be held in Maastricht (June 2005), Helsinki (February 2006), Leuven (September 2006) and Ispra (February 2007). Detailed information is available at

http://kei.publicstatistics.net/meetings.html

Funding

Coordination

Ralf Münnich
Eberhard-Karls University of Tübingen
Faculty of Economics
Dept. of Statistics, Econometrics and Operations Research
Mohlstraße 36, 72074 Tübingen, Germany
ralf.muennich@uni-tuebingen.de
KEI homepage: **http://kei.publicstatistics.net**

Project Partners

Eberhard-Karls University of Tübingen, Germany:
Ralf Münnich, Kersten Magg, Dominik Ohly, Rolf Wiegert

Joint Research Center, Ispra, Italy:
Andrea Saltelli, Niels Schulze, Giuseppe Munda, Stefano Tarantola, Michaela Saisana

Katholieke Universiteit, Leuven, Belgium:
Tom Van Puyenbroeck, Laurens Cherchye, Wim Moesen

University of Maastricht, MERIT, The Netherlands:
Anthony Arundel, Wendy Hansen

Statistics Finland, Finland:
Mikael Åkerblom, Tero Luhtala

KEI
KNOWLEDGE ECONOMY INDICATORS

Development of Innovative and Reliable Indicator Systems

EBERHARD KARLS UNIVERSITÄT TÜBINGEN

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

MERIT
University of Maastricht

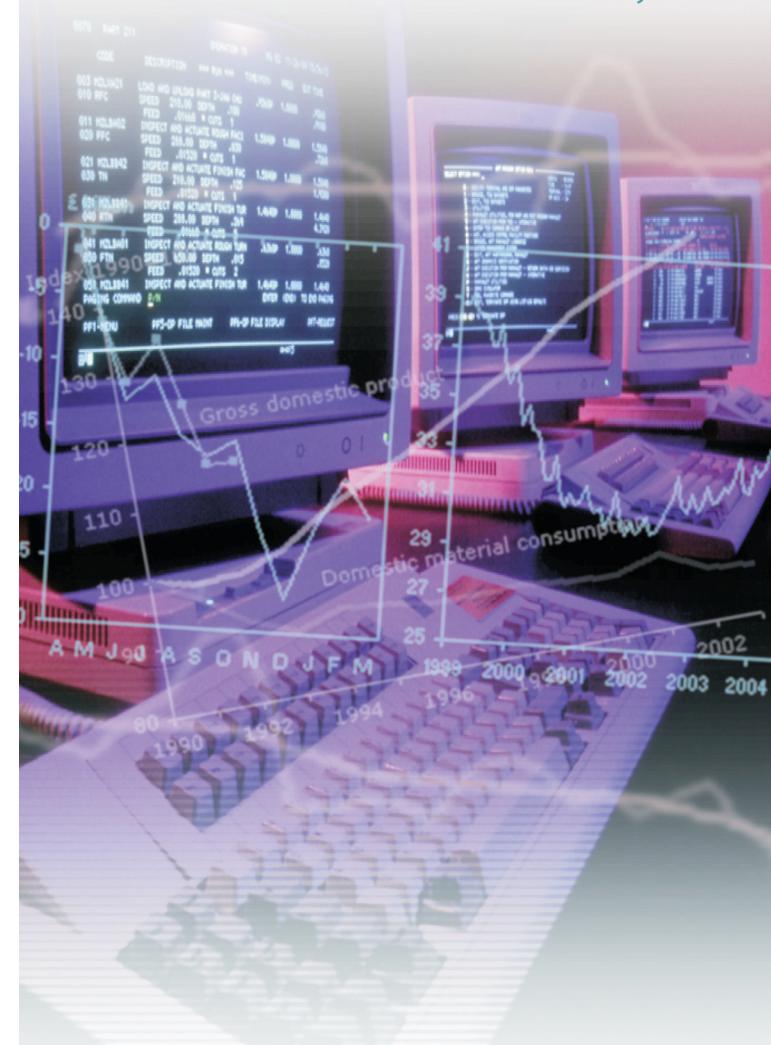ASSOCIATIE K.U.LEUVEN
Katholieke Universiteit Leuven

Tilastokeskus
Statistics Finland

SIXTH FRAMEWORK PROGRAMME

Description of the Work Packages (WPs)

KEI consists of seven research Work Packages (WPs) plus the final project report. The seven research WPs are divided into two main groups. The first group, consisting of WP1, WP2, and WP4, focuses on the theory of the KBE, policy needs, and the identification of useful indicators. The output of the first group is an essential input for the second group, consisting of WP3, WP5, WP6, and WP7. These WPs will statistically analyse indicators in order to identify robust composite indicators that can meet policy requirements.

WP1

Defining the Knowledge-Based Economy

WP1 spans both indicators and policy. The first phase will develop a theoretical framework for the project, building on previous research, in order to identify the main characteristics and drivers of a KBE for all economic sectors: high technology manufacturing, low and medium technology manufacturing, private services, and public services. The second phase will identify forward-looking policies that can promote a knowledge economy, meet other European goals, and adjust for new social and technological developments. The final phase will combine indicator and policy analysis through a series of short (less than five years) and mid-term (five to ten years) scenarios to evaluate the impacts of alternative policies on indicator outcomes.

WP2

Indicators for the KBE

WP2 will identify and evaluate potential indicators for measuring the drivers, characteristics, and key outputs of a knowledge economy and for meeting policy and user needs. The indicators will be assigned to logical categories within two major classifications of input and output indicators. The categories will be used in WP3 and WP5 to develop composite indicators. WP2 will collect data and supplementary information for each indicator and identify missing indicators for important phenomena.

WP3

Statistical Analysis of KBE Indicators

The objective of WP3 is to analyse key aspects of the quality of data for use with KBE indicators of interest. Since many sources of data for indicators are based on survey samples, special emphasis will be laid on the accuracy and statistical reliability of indicator values. The main purpose of the data quality analysis is to identify areas of indicator weakness and guide the selection of indicators. Further emphasis will be paid to the analysis of erroneous data and their influence on the reliability of the indicators for the KBE. Furthermore, it is intended to investigate indicator performance in respect to their analytical and statistical properties. The work on WP3 will be split into two parts: Phase **I** will summarise the current methodology whereas phase **II** will elaborate the methodology and tools needed for new developments in this area. Special emphasis will be given to the influence of non-response on the reliability of indicator values and the accuracy of regional sub-indicators.

WP4

The Way Forward: Innovative Use of KBE Indicators

WP4 focuses on the innovative use of indicators, either through finding solutions to missing indicators or identifying indicators that can meet future needs. When no indicators are available, WP4 will identify proxy indicators, alternatives such as new ways of analysing existing survey data, or develop new survey questions. WP4 will identify long-term indicators that measure fundamental inputs into a knowledge economy, such as some education indicators, and identify possible developments (either technological or social) within a knowledge economy that will require new or improved indicators in the short-term future. This may require changes to some indicators or the identification of alternative indicators that can cover future data needs.

WP5

Composite Indicators for the KBE

After a summary of the state-of-the-art in developing composite indicators, WP5 deals with the construction and testing of new composite indicators, suggesting improvement for the existing ones. Additional methodologies of aggregation will be applied following recent critiques of the existing aggregation procedures. Various approaches to extend user involvement will be tested and presentational issues and visualisation tools will be recommended based on feedback from users.

WP6

Role of Multinationals for Information on R&D

National indicators on R&D efforts are somewhat distorted by world-wide R&D activities of multinational companies. The aim of WP6 is to develop and test new indicators on the role of multinational companies for national indicators on R&D efforts in order to estimate the effects on national figures. The results may assist in evaluating how far the 3.0 percent target of R&D expenditure is reached. The intention is to form an expert group with 4 or 5 interested countries with access to enterprise level official R&D data. Depending on the countries, a representative set of multinationals will be chosen. Publicly available information on R&D in these companies will first be analysed as well as what is available from national R&D statistical publications. Then a paper with possible approaches will be produced for discussion in a small workshop with the chosen countries. The aim of the workshop is to agree on a common approach for data extraction. On the basis of the results the final report will suggest some methodologies for further dissemination and use.

WP7

Simulation Study

A set of simulations will test the accuracy and reliability of the indicators in a practical environment under different realistic assumptions and data quality standards. WP7 will address the robustness of the composite indicators to various policy scenarios, data quality and weighting / scaling approaches. The robustness assessment will be done on various inferences, such as leaders and laggards, middle-of-the-road performers, and on static versus dynamic performance.

WP8

Final Report

The final report will be split into two different reports. The first report will draw together policy-relevant results from all seven research WPs. The report will present and interpret the set of composite indicators developed in WP5, discuss their use in policy applications, and make recommendations for policy. The report will be written for a general audience and will be fully illustrated with charts and graphs of the results for all countries. The report will also include an annex with complete details on the data, including sources, and dates. The second report will focus on technical and methodological issues and provide a detailed overview of the project methodology and results from the project.