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Indicators for the Regional Innovation Profile – according amended STRINNOP Approach

DRAFT

Written by the Thematic Network

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"Promotion of Innovation and
Encouragement of SME Participation"

Discussion paper

Content:

1 Step 1: Identification of regional competencies

1.1 Transparency of regional know-how and competencies

Definition: The know-how and competencies of the regional technology providers (like research and university institutes) as well as of the regional firms are the basis for all regional innovation activities. Therefore it is indispensable to have an overview over the existing know-how as the starting point for innovation policy at all.

Source: own regional surveys by written questionnaire, telephone interviews or personal visits in regular intervals,
expert interviews

Measurement: Quantitiatve / Qualitative indicator

Within several RITTS and RIS projects some figures of the transparency of the innovation supporting infrastructure were collected:

% firms with transparency of the innovation supporting infrastructure:

Rhone-Alpes (F):	40%
Western Norway:	26%
Tirol (A):	26%
Lower Austria (A):	24%
Northern Sweden:	22%
Schleswig-Holstein (D)	21%
Hamburg (D):	20%
Southern Sweden	17%

If no quantitiatve data are available you may assess the transparency on basis of individual firms' visits and expert interviews

Metric:

0 := 10% of firms have sufficient transparency of the innovation supporting infrastructure;
no description of regional competencies at all
partial information exists only in "Heads", no written information

5 := 30% of firms have sufficient transparency of the innovation supporting infrastructure;
easy access to most most important regional know-how and competencies (e.g. flyer with rough description of know-how and contact person)

10 := 50% of firms have sufficient transparency of the innovation supporting infrastructure;
overview over innovation relevant know-how and competencies

of all regional technology providers, educational organisations, intermediaries and financiers, consultants;
detailed and structured information about gathered needs (e.g. "Who is who" map of innovation supporting services with detailed description, contact, references)

1.2 Transparency of firms' needs in innovation support

Definition: In close context with the mapping of the existing regional know-how and innovation potentials the firms' needs in innovation support have to be identified and visualised. This enables the regional innovation system to create precisely the complementary knowledge and need oriented innovation supporting services which are necessary to strengthen the competitiveness of the regional firms.

It takes some efforts to gather the firms' potentials and needs e.g. by written questionnaires or by firms' visits.

Source: own regional surveys by written questionnaire, telephone interviews or personal visits in regular intervals,
firms' visits

Measurement: Qualitative indicator

Metric:
- 0 := no gathering of firms' needs and no description at all partial information exists only in "Heads", no written information
- 5 := some identified needs from small scale surveys, but not representative sample,
existing information is written down
- 10 := overview over needs of at least 80% of the regional firms (assure representativeness!) , detailed and structured information about gathered needs (statistics, graphics)

1.3 RNSII (Regional National Summary Innovation Index)

Definition: identifies the leading regions within the country

Source: European Innovation Scoreboard 2002, Technical Paper No 3 (EU Regions)

Measurement: Tentative summary indicator of all EIS indicators

Metric:
- 0 := 0,22 (RNSII of Notio Aigaio (GR42): min RNSII of all EU regions within the EIS 2002)
- 5 := 1,12 mean value of min and max
- 10 := 2,01 (RNSII of Communidad De Madrid (ES3): max RNSII of all EU regions within the EIS 2002)

1.4 RRSII (Revealed Regional Summary Innovation Index)

Definition: identifies the leading regions within the EU,
The RRSII is designed to pinpoint "local leaders". Regions in highly performing countries will always look more favourable when compared directly to regions from less performing countries.

Source: European Innovation Scoreboard 2002, Technical Paper No 3 (EU Regions)

Measurement: Tentative summary indicator of all EIS indicators.
The RRSII is calculated as the average of the RNSII and the Regional European Summary Innovation Index (REUSII). The REUSII is calculated as the average of the indicators values indexed to the EU mean.

Metric: 0 := 18 (RRSII of Notio Aigaio (GR42): min RNSII of all EU regions within the EIS 2002)

5 := 121,5 (average of min and max)

10 := 225 (RNSII of Stockholm (SE01): max RNSII of all EU regions within the EIS 2002)

2 Step 2: Creation of regional Knowledge

2.1 Population with a tertiary education (% of 25-64 years age classes)

Definition: This is a general indicator of the supply of advanced skills. It is not limited to science and technical fields because the adoption of innovations in many areas, particularly in the service sectors, depends an a wide range of skills. Furthermore, it includes the entire working age of the population, because future economic growth could require drawing on the non-active fraction of the population. International comparisons of educational levels however are notoriously difficult due to large discrepancies in the educational systems, access, and the level of attainment that is required to receive a tertiary degree. Therefore, differences among countries should be interpreted cautiously.

Source: European Innovation Scoreboard, Technical Paper No 3 (EU Regions),
EUROSTAT, Labour Force Survey

Measurement: Quantitative indicator

Metric: 0 := 4,95 (Algarve PT15)

5 := 22,48 (average of min and max) (EU mean: 21)

10 := 40,01 (Vaeli-suomi FI14)

2.2 Participation in life-long learning (% of 25-64 years olds)

Definition: The reference population is all age classes between 25 and 64 years inclusive. A reference period of four weeks has been chosen in order to avoid distortion of information due to recall problems. The reference period is the last four weeks preceding the survey, except for France, the Netherlands (until 1999) and Portugal for which information is collected only if education or training is under way on the date of the survey. Education includes initial education, further education, continuing or further training, training within the company, apprenticeship, on-the-job training, seminars, distance learning, evening classes, self-learning, etc. as well as other courses followed for general interest: language, data-processing, management, art/culture, health/medicine courses. Before 1998, education was related only to education and vocational training which was relevant for the current or possible future job of the respondent.

A central characteristic of a knowledge economy is continual technical development and innovation Under these conditions, individuals need to continually learn new ideas and skills - or to participate in life-long learning. All types of learning are valuable, since it prepares people for "learning to learn". The ability to learn can then be applied to new tasks with social or economic benefits. The limitation of the indicator to a brief window of four weeks could reduce comparability between countries due to differences in adult education systems. Little is known at this time about such differences, but differences in the timing of national holidays, preferred times for adult education courses, the average length of adult courses, and other unknown factors could influence the results and reduce comparability. Technical Paper N° 5 of the 2002 EIS further elaborates on the issue of "Lifelong Learning for Innovation".

Source: European Innovation Scoreboard, Technical Paper No 3 (EU Regions),
EUROSTAT, Labour Force Survey

Measurement: Quantitative indicator

Metric: 0 := 0,16 (Notio Aigaio GR41)

5 := 12,67 (average of min and max) (EU mean: 8,5)

10 := 25,18 (South West UKK)

2.3 Public R&D Expenditure (GERD – BERD) (% GDP)

Definition: The indicator is the percentage of GDP due to public R&D spending. The latter is defined as the difference between total R&D expenditures (GERD) and business enterprise expenditures

(BERD). It thus includes higher education expenditure in R&D (HERD), government expenditure in R&D (GORD) and private non-profit expenditure in R&D (PNRD). Note that this definition has changed compared to the 2001 EIS as it now also includes private non-profit expenditure in R&D (PNRD). This indicator was identical to the initial Structural indicator 2.2: R&D expenditure. The definition of Structural indicator 2.2 was changed in October 2002 [4]: the R&D indicators are now disaggregated by source of finance rather than the sector carrying out the R&D expenditure. This change in definition could, due to time constraints, not be taken into account in the 2002 EIS.

In addition to the production of basic and applied knowledge in universities and higher-education institutions, publicly funded research offers several other outputs of direct importance to private innovation: trained research staff and new instrumentation and prototypes.

Source: European Innovation Scoreboard, Technical Paper No 3 (EU Regions),
EUROSTAT, Labour Force Survey

Measurement: Quantitative indicator

Metric: 0 := 0,00 (Aaland FI2)

5 := 1,04 (average of min and max) (EU mean: 0,65)

10 := 2,08 (Flevoland NL23)

2.4 Business Expenditure on R&D (BERD) (% GDP)

Definition: This indicator measures the R&D expenditure (from all sources of funding) of the business sector (manufacturing and services) as a percentage of GDP. This indicator was identical to the initial Structural indicator 2.2: R&D expenditure. The definition of Structural indicator 2.2 was changed in October 2002 [5]: the R&D indicators are now disaggregated by source of finance rather than the sector carrying out the R&D expenditure. This change in definition could not, due to time constraints, be taken into account in the 2002 EIS.

The indicator captures the formal creation of new knowledge within firms. It is particularly important in the science-based sectors (pharmaceuticals, chemicals and some areas of electronics) where most new knowledge is created in or near R&D laboratories.

Source: European Innovation Scoreboard, Technical Paper No 3 (EU Regions),
EUROSTAT, Labour Force Survey

Measurement: Quantitative indicator

Metric: 0 := 0,00 (Aaland FI2, Acores PT2)

5 := 2,14 (average of min and max) (EU mean: 1,3)

10 := 4,27 (Vaestsverige SE04)

2.5 High-tech EPO patent applications (per million population)

Definition: The indicator is defined as the number of patent applications (reference year is year of filing) at the EPO in high-technology patent classes per million population. The national (and regional) distribution of the patent applications is assigned according to the address of the inventor. The high technology patent classes include pharmaceuticals, biotechnology, information technology, and aerospace. The following IPC subclasses are included:

- B41J: typewriters; selective printing mechanisms, i.e. mechanisms printing otherwise than from a form; correction of typographical errors
- G06C: digital computers in which all the computation is effected mechanically
- G06D: digital fluid-pressure computing devices
- G06E: optical computing devices
- G06F: electric digital data processing
- G06G: analogue computers
- G06J: hybrid computing arrangements
- G06K: recognition of data; presentation of data; record carriers; handling record carriers
- G06M: counting mechanisms; counting of objects not otherwise provided for
- G06N: computer systems based on specific computational models
- G06T: image data processing or generation, in general
- G11C: static stores
- B64B: lighter-than-air aircraft
- B64C: aeroplanes; helicopters
- B64D: equipment for fitting in or to aircraft; flying suits; parachutes; arrangements or mounting of power plants or propulsion transmissions
- B64F: ground or aircraft-carrier-deck installations
- B64G: cosmonautics; vehicles or equipment therefore
- C12M: apparatus for enzymology or microbiology

- C12N: micro-organisms or enzymes; compositions thereof; propagating, preserving, or maintaining micro-organisms; mutation or genetic engineering; culture media
- C12P: fermentation or enzyme-using processes to synthesize a desired chemical compound or composition or to separate optical isomers from a racemic mixture
- C12Q: measuring or testing processes involving enzymes or micro-organisms
- H01S: devices using stimulated emission
- H01L: semiconductor devices; electric solid state devices not otherwise provided for
- H04B: transmission
- H04H: broadcast communication
- H04J: multiplex communication
- H04K: secret communication; jamming of communication
- • H04L: transmission of digital information, e.g. telegraphic communication
- H04M: telephonic communication
- H04N: pictorial communication, e.g. television
- H04Q: selecting
- H04R: loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers; deaf-aid sets; public address systems
- H04S: stereophonic systems

This indicator complements indicator on business R&D in that patenting captures new knowledge created anywhere within a firm and not just within a formal R&D laboratory. The indicator also measures specialisation of knowledge creation in fast-growing technologies.

Source: European Innovation Scoreboard, Technical Paper No 3 (EU Regions),
EUROSTAT, Labour Force Survey

Measurement: Quantitative indicator

Metric: 0 := 0,00 (several regions)

5 := 93,9 (average of min and max) (EU mean: 28)

10 := 187,8 (Uusimaa FI11)

2.6 Adequate interfaces at technology providers

Definition: Adequate interfaces at technology providers (science parks, legally independent technology transfer organisation,

laboratories open for private cooperation firms etc.) facilitate the knowledge diffusion between research and business and provide the appropriate framework for the implementation of technology transfer projects.

Source: survey at technology providers, expert interviews, firms' questionnaire survey

Measurement: Qualitative indicator

Metric: 0 := technology providers have no focus on business relationships

5 := single interfaces at technology providers with need oriented services. Willingness of researcher to collaborate with firms

10 := existence of competent and specialised interfaces which are fully accepted by the private companies in form of high usage and generation of own income. High sufficiency of companies with offered services and infrastructure.

2.7 Education and training with respect to future entrepreneurs

Definition: Future entrepreneurs have to get acquainted with entrepreneurial thinking and have to learn the entrepreneurship thinking as early as possible. Therefore, the educational system has to add pragmatic entrepreneurial topics to the curriculum. The establishment of professorships for entrepreneurship or the promotion of potentially suitable students / post graduates in specific entrepreneurship training courses helps to cultivate the entrepreneurial spirit and will generate specific knowledge which will improve the quality and success of new start-ups.

Source: survey at educational institutions, expert interviews, firms' questionnaire survey

Measurement: Qualitative indicator

Metric: 0 := regional educational organisations put no emphasis on entrepreneurship,
curriculum contents only theory

5 := some educational organisations have good relationships with industry in order to involve practical issues in the curriculum

10 := strong exchange and collaboration between industry and educational organisations,
temporary professorships for entrepreneurs and specific lectures by experienced practitioners,
own study courses for entrepreneurship established in the region

2.8 % national technology leadership (of total sample of firms)

Definition: National technology leadership documents the existence of outstanding technological knowledge within the county. Technology leadership can cover a broad bandwidth but can also mean the leadership in a small niche which means that you have certain variations.

Restrict the sample of firms to medium and high tech sectors?

Source: own regional surveys by written questionnaire, telephone interviews or personal visits in regular intervals, expert interviews

Measurement: Quantitiatve / Qualitative indicator

If no surveys exists, expert interviews can give some insight in national technologhy leadership on order to make a rough assessment for the regional firms

Metric:
0 := 10% are national technology leader

5 := 35% of firms are national technology leader
qualitative assessment: some strong national technology leader are located in the region

10 := 60% of firms are national technology leader

values for metric??

2.9 International technology leadership

Definition: International technology leadership documents the existence of outstanding technological knowledge on international level. Technology leadership can cover a broad bandwidth but can also mean the leadership in a small niche which means that you have certain variations.

Restrict the sample of firms to medium and high tech sectors?

Source: own regional surveys by written questionnaire, telephone interviews or personal visits in regular intervals, expert interviews

Measurement: Quantitiatve / Qualitative indicator

If no surveys exists, expert interviews can give some insight in national technologhy leadership on order to make a rough assessment for the regional firms

Metric:
0 := 0% are international technology leader

5 := 15% of firms are international technology leader
qualitative assessment: some strong national technology leader are located in the region

10 := 30% of firms are international technology leader

values for metric??

3 Step 3: Stimulation of innovation activities

3.1 Existence of "regional innovation culture" and "entrepreneurship culture"

Definition: Collaboration within a firm as well as with external partners are essential for the firms innovation success especially if the firm has no own sufficient resources due to its small size. The ability to collaborate can be enhanced by external stimulation of entrepreneurs e.g. in showing success stories for successful cooperation. Especially in family-owned enterprises strong hierarchy and detailed defined behaviour rules exists which often hamper employees in the implementation of innovative ideas despite the required skills exists. Thus an open group-oriented including an enlargement of responsibility on lower levels has to be established in SMEs.

Source: personal visits, expert interviews

Measurement: qualitative indicator

Metric: 0 := firms are not open for external collaboration, authoritarian leadership within the companies

5 := some firms are open for external collaboration, general acknowledgement of the team oriented leadership

10 := firms are highly open for collaboration, firms practice team work and further innovation stimulating activities like brainstorming,

3.2 Existence of proactive approach to contact firms'

Definition: In general a large proportion of regional entrepreneurs have vague fear of contact external organisations or even not aware of possible external innovation support for their own firm. Therefore it is important that actors of the innovation supporting infrastructure follow the proactive approach in visiting the regional companies in order to make them aware for latent weaknesses and beneficial external help. The more systematic and structured the proactive approach is performed the larger will be the effects on the innovation awareness of the regional firms.

Source: analyses of the existing innovation supporting infrastructure

Measurement: qualitative indicator

Metric: 0 := no regional proactive approach exists

5 := some doted regional proactive approaches exists, some follow up

10 := a systematic, the whole region covering proactive approach exists with detailed and structured documentation of the results triggering follow ups, the resources are sufficient to assure visits of the interesting regional firms at regular intervals (e.g. every 3 years)

3.3 Communication platform to facilitate firms' access to technology and service providers

3.4 Range of stimulation activities and quality

3.5 Existence of (pre-)seed activities

4 Step 4: Implementation of firms' innovation activities

4.1 GDP per capita

Definition: GDP per capita is a important indicator to measure the economic performance of a region. According the definition that innovation means bringing new technology in markets and thus make turnover with new products the GDP per capita is a indirect indicator for innovation success.

Source: European Innovation Scoreboard, Technical Paper No 3 (EU Regions),
EUROSTAT, Labour Force Survey

Measurement: Quantitative indicator

Metric: 0 := 6546 (Ipeiros GR21)

5 := 23407 (average of min and max)

10 := 40267 (Hamburg DE6)

4.2 employment in medium/high tech manufacturing (% of total work force)

Definition: The medium-high and high technology sectors include chemicals NACE (24), machinery (NACE 29) office equipment (NACE 30), electrical equipment (NACE 31), telecom equipment (NACE 32), precision instruments (NACE 33), automobiles (NACE 34), and aerospace and other transport (NACE 35). The total workforce includes all manufacturing and service sectors.

The percentage of employment in medium-high and high technology manufacturing sectors is an indicator of the share of the manufacturing economy that is based on continual innovation through creative, inventive activity. The use of total employment gives a better indicator than using the share of manufacturing employment alone, since the latter will be affected by the hollowing out of manufacturing in some countries.

Source: European Innovation Scoreboard, Technical Paper No 3 (EU Regions),
EUROSTAT, Labour Force Survey, GSO survey

Measurement: Quantitative indicator

Metric: 0 := 0,88 (Canarias ES7)

5 := 9,59 (average of min and max)

10 := 18,30 (Baden-Württemberg DE1)

4.3 employment in high tech services (% of total work force)

Definition: This indicator focuses on three leading edge sectors that produce high technology services: post and telecommunications (NACE 64); information technology including software development (NACE 72); and R&D services (NACE 73). The total workforce includes all manufacturing and service sectors.

The high technology services both provide services directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy. The latter can increase productivity throughout the economy and support the diffusion of a range of innovations, particularly those based on ICT.

Source: European Innovation Scoreboard, Technical Paper No 3 (EU Regions),
EUROSTAT, Labour Force Survey, GSO survey

Measurement: Quantitative indicator

Metric: 0 := 0,74 (Norte PT11)

5 := 4,58 (average of min and max)

10 := 8,41 (Stockholm SE01)

4.4 % turnover with new products (less than 3 years) (of total turnover)

Definition: Strong firms' innovation activities result in new products with decreasing product life cycles. In reverse the % turnover with new products is a indicators for successful innovation activities.

The considered sectors include the medium-high and high technology sectors including chemicals NACE (24), machinery (NACE 29) office equipment (NACE 30), electrical equipment (NACE 31), telecom equipment (NACE 32), precision instruments (NACE 33), automobiles (NACE 34), and aerospace and other transport (NACE 35) as well as the high-tech service sectors post and telecommunications (NACE 64); information technology including software development (NACE 72); and R&D services (NACE 73).

Source: own regional surveys by written questionnaire, telephone interviews or personal visits in regular intervals, firms' visits

Measurement: Quantitative indicator

Metric: 0 := 0%

5 :=

10 := 50%

4.5 % of innovative firms (of total sample)

Definition: An innovative firm is defined as

- at least 20% turnover with new products less than 3 years ol
- national or international leadership
- at least 6% R&D of turnover

Source: own regional surveys by written questionnaire, telephone interviews or personal visits in regular intervals, firms' visits

Measurement: Quantitative indicator

Metric: 0 := 0%

5 :=

10 := 30%

4.6 Range and quality of implementation services

4.7 Infrastructure and accompanying services for start-ups and quality

4.8 Number of new start-ups in innovation relevant areas

5 Step 5: Focus on regional strength: clustering and networking

5.1 existence of ausgeprägtes regional sector profil: sectors with highest labor force

5.2 focus on thematic topics

5.3 private imitative within the regional cluster activities

5.4 public initiatives for networking and clustering

6 Step 6: Internationalisation

6.1 % of export / total turnover

6.2 Existence of international networks

6.3 Range and quality of services to foster firms' internationalisation activities

7 Step 7: Marketing if the regional innovation profile

7.1 Communication and promotion activities

e.g. press articles on regional technological competence per year

marketing budget, follow up and feed back

7.2 participation in international innovation supporting networks/Projects

attendance of trade / technology fairs and scientific congresses

7.3 (inter)national Lobbying

8 Accompanying step: Coordination of the regional innovation supporting infrastructure

8.1 Existence of communication plattform (steering committee)

8.2 existence of holistic regional innovation strategy (vision, turning into action, adoption and further development)

9 Accompanying step: Monitoring and evaluation of the regional innovation activities

9.1 Monitoring and evaluation of Step 1

defined targets & mile stones, responsibilities, methodology, follow of results

9.2 Monitoring and evaluation of Step 2

9.3 Monitoring and evaluation of Step 3

9.4 Monitoring and evaluation of Step 4

9.5 Monitoring and evaluation of Step 5

9.6 Monitoring and evaluation of Step 6

9.7 Monitoring and evaluation of Step 7

10 Accompanying step: Financing of the regional innovation activities and supporting infrastructure

10.1 Total amount of public money for regional innovation support

10.2 % regional public money for innovation support (of GDP)