STEP REPORT 15-2003

TITLE	**Oslo Innovation Scoreboard – an attempt to develop a comparable set of indicators used in the Regional Innovation Scoreboard for the Oslo Region.**
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CLIENT(S)	Oslo Teknopol and SOCINTEC

REPORT NO.	CLASSIFICATION	CLIENTS REF.	
STF38A03815	Open		
CLASS. THIS PAGE	ISBN	PROJECT NO.	NO. OF PAGES/APPENDICES
	82-14-03208-3	38815200	16
ELECTRONIC FILE CODE		PROJECT MANAGER (NAME, SIGN.)	CHECKED BY (NAME, SIGN.)
Oslo_Innovation_Scoreboard_Oslo_teknopol_endelig_nettutgave.doc		Morten Fraas	Anders Ekeland
FILE CODE	DATE	APPROVED BY (NAME, POSITION, SIGN.)	
	01.08.2003	Senior Researcher Åge Mariussen	

ABSTRACT

Norway is in many ways integrated with the European markets, but this is not the case considering statistics developed by EUROSTAT on regional level and the development of the European Innovation Scoreboard (EIS). This paper is making an attempt to develop an Innovation Scoreboard for the Oslo-region (OIS) by using the framework from the European Trend Chart on Innovation and the EIS.

More specifically the paper is making an attempt to develop the index, Revealed Regional Summary Innovation Index (RRSII) for the Oslo-region. This is an index that tries to locate European local leaders by taking into account the regions relative performance within the EU and the region's relative performance within the country. This index is based on seven indicators that is composed and calculated for the Oslo-region.

The RRSII-index for the Oslo-region is according to our calculation and data, 170. Compared with other EU-regions the Oslo-region is doing very well.

KEYWORDS	ENGLISH	NORWEGIAN
GROUP 1	Industrial Management	Teknologiledelse
GROUP 2	Innovation	Innovasjon
SELECTED BY AUTHOR	Indicators	Indikatorer
	Regional	Regional

Preface

STEP/SINTEF has been asked by Oslo Teknopol to make an attempt to develop and use the framework from European Trend Chart on Innovation and the European Innovation Scoreboard (EIS) on Oslo/Akershus, a region involving the capitol of Norway and it surroundings (Oslo-region). Oslo Teknopol wants a short description on how some of these regional indicators can be employed on this region and further seeks to put together the index, Revealed Regional Summary Innovation Index (RRSII) for the Oslo-region. Although Norway in many aspects is highly integrated with the European markets this is not the case on regional statistics and Norway is not included in the Regional Innovation Scoreboard for Europe.

The analysis has been based on different data sources and the index has been calculated according to the method described in '2002 European Innovation Scoreboard – Technical paper No 3: EU Regions'.

The formal contracts partner of this project is SOCINTEC, and STEP/SINTEF has entered into a subcontract to assist SOCINTEC in the "thematic network" from the European Commission, "INNOVATION AND NETWORKING ACTIVITIES IN LARGE METROPOLITAN AREAS" (acronym: INNOPOLITAN).

I would like to thank Anders Ekeland, Eric Iversen and Svein Olav Nås at STEP Centre for innovation research for generating data and a thank to Oslo Teknopol for the opportunity to be engaged in this project.

Oslo, August 2003

Morten Fraas
Project leader

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1 Introduction

Innovation is a priority of all Member States of the European Commission. Throughout Europe, hundreds of policy measures and support schemes aimed at innovation have been implemented or are under preparation. I 1996 the 'First Action Plan for Innovation in Europe' was established by the European Commission in order to provide a common analytical and political framework for innovation policy in Europe. Building on the Action Plan and serving the " open policy co-ordination approach" laid down in the Lisbon Council in 2000, the Trend Chart on Innovation was established and has been running since January 2000. It delivers summarised and concise information and statistics on innovation policy, performances and trends inn all Member States, Candidate Countries and Associate Countries inclusive Norway. Despite this Norway is not in on the Regional innovation Scoreboard.

The aim of the project

This paper is an attempt to compare Oslo/ Akershus, the Norwegian metropolitan area with other EU regions, more specific the 'local' EU innovation leaders. This is done for all the Member States in the publication from the Innovation/SMEs programme "2002 European Innovation Scoreboard - Technical Paper No. 3: EU Regions". The ranking of local leaders are based on the index, RRSII (revealed regional summary innovation index). See table below.

Table 1: 'Local' EU innovation leaders

Rank	Region	Country	RRSII[1]
1	Stockholm	Sverige	225
2	Uusimaa (Suuraule)	Finland	208
3	Nooord-Brabant	Nederland	191
4	Eastern	Storbritannia	161
5	Pohjois-Suomi	Finland	161
6	Ile-de-France	Frankrike	160
7	Bayern	Tyskland	151
8	South East	Storbritannia	150
9	Comunidad de Madrid	Spania	149
10	Baden-Würtemberg	Tyskland	146
17	Wien	Østerrike	126
21	Vlaams Gewest	Belgia	112
22	Lombardia	Italia	112
31	Southern and Eastern	Irland	108
49	Lisboa E Vale Do Tejo	Portugal	94
50	Attiki	Hellas	93

Source: EIS 2002, Technical paper No 3. EU Regions, p.10.

This is an index that tries to locate local leaders by taking into account the regions relative performance within the EU and the region's relative performance within the country.

The primary gold with this project is to examine the possibilities to develop a comparable set of indicators that are used in the Regional Innovation Scoreboard, consisting of the 7 indicators referred to below and which frame the index RRSII, for the Oslo region (Oslo/ Akershus).

[1]Revealed Regional Summary Innovation Index (RRSII) is calculated as the average of the Regional National Summary Innovation Index (RNSII). The Regional European Summary Innovation Index (REUSII) is calculated as the average of the indicator values indexed to the EU mean.

1 Human Resources:
1.2 Population with tertiary education (% of 25-64 years age classes)
1.3 Participation in life-long learning (% of 25-64 years olds)
1.4 Employment in medium-high and high-tech manufacturing (% of total workforce)
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2 The Creation of New Knowledge:
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2.2 Business expenditure on R&D (BERD) (% GDP)
2.3.1 EPO high-tech patent applications (per million population)

We will use relevant data sources that we have at our disposal in addition to the methodology and definition of the existing indicators in European Innovation Scoreboard (EIS) and Regional Innovation Scoreboard (RIS)[2].

2 Methododology

This chapter is a description on how the index is being calculated.

Revealed Regional Summary Innovation Index
The Revealed Regional Summary Index (RRSII) tries to take into account both the region's relative innovative performance to the EU mean as the region's relative performance within the country. For this two indexes are calculated of which then the mean value is taken for the RRSII:

- The average of the indicator values indexed to the country mean (RNSII: regional national summary innovation index):

$$\text{RNSII} = \left(\frac{100}{n}\right) * \sum_i \frac{X_{ijk}}{\overline{X_k}}$$

- The average of the indicator values indexed to the EU mean (REUSII: regional European summary innovation index):

$$\text{REUSII} = \left(\frac{100}{n}\right) * \sum_i \frac{X_{ijk}}{\overline{EU}}$$

where X_{ijk} is the value of the indicator *i* for region *j* in country *k*, $\overline{X}_{ik}$ is the value of indicator *i* for country *k*, $\overline{EU}_i$ is the value of indicator *i* for the EU, and n is the number of indicators for which regional data are available.

The RRSII is the calculated as the unweighted average of the RNSII and the REUSII.

[2] Relevant documents are: 2002 European Innovation Scoreboard: Technical Paper No 3 EU Regions, Technical Paper 4 Indicators and Definitions, Technical Paper No 6. Methododology report. All documents are available from the Cordis homepage. www.cordis.lu/trendchart.

3 European Innovation Scoreboard (EIS), Definitions

This chapter gives an overview on the definitions and interpretations used in the European Innovation Scoreboard (EIS) and which is the basis for the production of the Oslo Innovation Scoreboard (OIS).

Population with tertiary education (% of 25-64 years age classes)
Definition
The percentage of the total working age population (25-64 years age classes) with some form of post-secondary education (International Standard Classification of Education, 1997 (ISCED 5 and 6)).

Interpretation
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 on a wide range of skills. Furthermore, it includes the entire working age 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 educational systems, access, and the level of attainment that is required to receive a tertiary degree. Therefore, differences among countries should be interpreted cautiously.

Sources: EUROSTAT. Labour Force Survey, GSO Survey

Participation in life-long learning (% of 25-64 years old)
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. This indicator is identical to Structural indicator 1.7.

Interpretation
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”.

Sources: EUROSTAT. Labour Force Survey, GSO Survey

Employment in medium-high and high-tech manufacturing (% of total workforce)
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.

Interpretation
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.

Sources: EUROSTAT. Labour Force Survey, GSO Survey

Employment in high-tech services (% of total workforce)
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.

Interpretation
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.

Sources: EUROSTAT. Labour Force Survey, GSO Survey

Public R&D expenditures (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 20024: 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.

Interpretation
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.

Sources: EUROSTAT. Labour Force Survey, GSO Survey

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 20025: 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.

Interpretation
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.

Sources: EUROSTAT. Labour Force Survey, GSO Survey

EPO high-tech 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 microorganisms
- 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

Interpretation
This indicator complements indicator 2.2 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.

Sources: EUROSTAT, GSO Survey.

4 Norwegian R&D statistics and data sources

Norwegian R&D statistics[3]

In Norwegian R&D statistics, manpower and expenditure are classified in relation to three sectors of performance: Industry sector, which includes companies, i.e. units producing goods or services for sale on the open market; Higher education sector, which includes universities (and teaching hospitals), university colleges, and state colleges; Institute sector, which includes research institutes and other R&D-performing units not included in the two above sectors.

Most of the R&D in this sector is performed in units with R&D as their main activity, i.e. research institutes. The remaining units have other main objectives, R&D only make up a smaller share of their total activities. Examples of such units include administrative agencies, industry associations, and museums. Non-teaching hospitals are also classified in the institute sector.

Of the total capital used for R&D in Norway in 2001 (NOK 24,500 mill.), the institute sector accounted for almost NOK 5,600 mill, or close to one fourth of the total, with an R&D staff of 9,300 performing 7,000 R&D full-time equivalents. R&D expenditure in the institute sector was slightly smaller than in the higher education sector (with NOK 6,300mill. or 26 per cent). The industry sector is by a huge margin the largest R&D performing sector with expenditures of NOK 12,600 mill. or 52 per cent of the total.

Data sources

To examine the possibilities to develop comparable set of indicators to those used in the Regional Innovation Scoreboard, we will use some other data sources to them that has been employed by the Trend Chart on Innovation.

[3] The description of the institute sector is taken from NIFUs homepage: http://www.nifu.no/instkat/enginst/enginst.html.

4.1.1 Register data

In Norway, each individual and each organisation (enterprise; establishment) has unique identification number, which is used in a variety of administrative and statistical registers. The main administrative registers used are population registers, taxation registers, social security reregisters, registers of building and dwellings, business and examination registers. We will in this report use different basic data than European Trend Chart on Innovation. This will be discussed in grater detail below. In this paper we use register data and not Labour Force Survey (LFS), because of better quality. This concerns indicator 5.1.2, 5.1.4 and 5.1.5.

4.1.2 Educational classification

The basic classification is the international Standard classification of Education (ISCED). Norway has its own classification system that is more detailed but fully compatible with ISCED. In this report we have used the Norwegian Standard for practical reasons. The relation between ISCED and the Norwegian standard are roughly described in the table below:

Table 2: The International Standard Classification of Education roughly compared with the Norwegian Standard.

	From year	To year	Norway	ISCED
Primary school	1	6	100000	10000
Secondary school	7	9	200000	20000
High-school, level I	10	10	300000	30000
High-school, level II	11	12	400000	30000
University level I (one or two years)	13	14	500000	50000
University level II (three or four years)	15	16	600000	60000
University level III (more than four years)	17	18	700000	70000
Ph.D., research competence	18		800000	70000

The Norwegian standard is different from ISCED on high school level for reasons that are of no importance in this context, since we will concentrate on people with at least twelve years of formal education (ISCED 5 and 6). The Norwegian – as most national standards – in contrast to ISCED do differentiate people with Ph.D.'s from the highest "normal" academic degree. But for the purposes of this chapter, we do not need this level of detail4. The Norwegian classification code is 6-digit and ISIC is 5-digit, but in most analysis only the first digit – the level of education and the second digit – the main field of education is used. But the classification allows analysis of very specific educational groups using all the digits (subdivisions).

4.1.3 Industrial classification

The level of detail of the NACE classification applied in this report is 2-digit NACE and is used for all selected sectors.

This paper brings accurate and recent statistics on employment in the Oslo region. The region is defined as the two counties Oslo and Akershus. It is very important to note that it is the persons working in these two counties that constitute the population. This means that the numbers will only be roughly comparable to most other official statistics because they are as a rule made on the basis of where people live.

[4] Since the "modern", Anglo-American Ph.D. became a part of our university education the last ten years, the number of Ph.D.s has "exploded" one has to do a more detailed analyses not to get misleading results when it comes to number of Ph.D.s in various branches etc.

4.1.4 R&D-statistics

Statistics relating to Norwegian R&D are produced every second year, commissioned by the Research Council of Norway, and follow the statistical guidelines of the OECD. Statistical surveys are carried out for all the three sectors of R&D performance. Statistics Norway is responsible for compiling the R&D statistics for the Industry. The Norwegian Institute for Studies in Research and Higher Education (Norwegian abbr. NIFU) is responsible for both the Higher Education sector and the Institute sector, as well as for merging the sectorial statistics into the national R&D statistics for Norway. The latest survey is from 2001 and we have used some of the results which are going to be published in 'Science and Technology Indicators for Norway 2003' later in 2003.

4.1.5 Norwegian Patent Application

Norway is not an EPO member and to get a better idea of high-tech patenting in Norway we will use domestic patent data for Norway, Norwegian Patent Office (NPO). The comparability between NPO and EPO is not optimal, but is expected to give a more representative picture of the Norwegian high-tech patenting, which we are going to use as an indicator.

5 Oslo Innovation Scoreboard (OIS)

The 'new' indicators

5.1 Human Resources:

5.1.2 Population with tertiary education (% of 25-64 years age classes in the Oslo-region)

To find this indicator we have used register data for the year 2001. The percentage of total age population (25-64 years age classes) with some form of post-secondary education (ISCED 5 and 6)[5], in 2001 was for the Oslo-region 38,3 percent.

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

Due to lack of easily accessible data on this specific indicator we have used the average of Norway employed in the 2002 European Innovation Scoreboard[6]. The average for the Oslo Region is probably higher than 14.2 %due to the fact that the Oslo region is a dominating location for public and private services. The region is also enriched with substantial shares of manufacturing activities in some national industries, such as printing, and publishing and the tobacco industry. We will not discuss this further, but only point out that the figure presented here can be encumbered with a bias.

5.1.4 Employment in medium-high and high-tech manufacturing (% of total workforce in Oslo-region)

The employment in medium-high and high-tech manufacturing in percent of the total workforce in the Oslo-region was according to register data from 2001, 2.2 percent.

The medium-high and high technology sectors include the following 2-digit NACE codes: chemicals (24), machinery (29) office equipment (30), electrical equipment (31), telecom equipment (32), precision instruments (33), automobiles (34), and aerospace and other transport (35).

[5] For comparison between the Norwegian standard and ISCED, see paragraph 4.1.2.

[6] 2002 European Innovation Scoreboard – Technical paper No 4: Indicators and Definitions. Year used is 2001. Sources: EUROASTAT, Labour Force Survey.

This indicator is low compared to the national figure (4.2 percent) and compared to other regions in Scandinavia. Norway does not have a traditional strong medium-high and high-tech manufacturing. In resent years much of the manufacturing industry have also been moved out of the Oslo-region or been closed down.

5.1.5 Employment in high-tech services (% of total workforce in Oslo-region)
The employment in Employment in high-tech services in percent of the total workforce in the Oslo-region was according to register data in 2001, 8.0 percent.

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). This indicator is over twice as large as the EU average (3.6 percent) and nearly twice as large as the average for Norway (4.4 percent).

5.2 The Creation of New Knowledge:
5.2.1 Public R&D expenditures (GERDR - BERDR) (% GDPR)
Gross domestic expenditure on R&D (GERD) is "…total intramural expenditure on R&D performed on the national territory during a given period" (Frascati Manual 2002, p. 121). We have used a regional distribution (equal 3. digit NUTS-level) of R&D intramural expenditures. This is at a county-level in Norway and two counties comprise the Oslo region: Oslo and Akershus. The indicator is also disaggregated by source of finance rather than the sector carrying out the R&D expenditure. This is in line with how EIS will define this indicator in the future. Most of the institutions, which are financing the R&D in Norway, are located in the Oslo-region.

In Norway we have an institute sector and in international R&D statistical terms this sector includes units from the government and private non-profit sectors, and also non-profit institutions performing R&D within the business enterprise sector. As the funding structure indicates, the institute sector serves both the private and the public sectors.

The GERD for the Oslo-region (GERDR) is 11002.2 million NOK.

Business enterprise sector on R&D (BERD) is defined as: "All firms, organisations and institutions whose primary activity in the market production of goods or services (other than higher education) for sale to the general public at an economically significant prise [and] [t]he private non-profit institutions mainly serving them" (Frascati Manual 2002, p. 54).

The BERD for the Oslo-region (BERDR) is 5375 million. NOK and GDPR for the Oslo region is 363 883 million NOK. From these figures the Public R&D expenditures in the Oslo-region in percent of the regions GDP (GDPR) is 1.45 percent.

5.2.2 Business expenditure on R&D (BERD) (% GDP)
Business enterprise sector expenditure on R&D (BERD) is defined as: "All firms, organisations and institutions whose primary activity in the market production of goods or services (other than higher education) for sale to the general public at an economically significant prise [and] [t]he private non-profit institutions mainly serving them" (Frascati Manual 2002, p. 54).

For our purpose we use R&D expenditures disaggregated by source of finance and county, carrying out the R&D and not by the sector carrying out the expenditure. The main reason for this is the fact that the indicator was changed for the EIS in 2002, even though it was not taken into account in 2002 due to time constraints.

For this reason we use figures from the forthcoming Science and Technology Indicators for Norway – 2003, and specially table A.2.6. The BERD for the Oslo-Region (BERDR) in percent of regional GDP (GDPR) can bee calculated as follows: Business R&D = (BERDR) = (Oslo county 3009,9 Mill NOK) + (Akershus county 2725,1 Mill. NOK)) /(GDPR (year 2000) = 363 883 mill.kr) = 1,58 %[7]

5.2.3 EPO high-tech patent applications (per million population)

The Trend-Chart Scoreboard (2002) indicates that Norwegian patenting in high-technology sectors is significantly weaker than the EU average. At 68 high-tech applications (or 15 per million population) in 2000, Norwegian high-tech patenting is almost 50% below the European mean. It is even further behind all its Nordic neighbours.

This indication is based on participation in patent-applications filed with the European Patent Office (EPO). EPO applications provide a fairly level basis on which to compare the patenting activity of EPC signatory states (20 in 2000), which include all EU countries. As a result, the EPO increasingly acts as the natural channel for domestic applications in countries like Denmark, Finland and Sweden. Norway is however not an EPC contracting state. As a consequence, comparisons using EPO applications risk under-representing Norwegian patenting activity.

The basis for comparison becomes somewhat biased because filing with the EPO is a different proposition for a Norwegian than for a national of an EPC state. This difference translates into a generally higher propensity for applicants within contracting states to use the EPC system than for applicants from outside jurisdictions. There are several reasons to expect a higher propensity within contracting states. A primary reason is that the applicant's home-market is within the EPC area. In this situation a basic EPO application is an immediate alternative to a domestic-application. The applicant will be inclined to file through the EPO (or Euro-PCT) routes especially in cases where he wants to extend the domestic application to other EPC states.

Norwegian applicants do not enjoy this home-court advantage. When the home-market is Norway, EPO does not represent an immediate alternative to the domestic application for the Norwegian applicant. In order show up in the EPO data, the applicant will basically have to apply at home and then seek an extension through the EPO (or the Euro-PCT), which is more expensive and more complicated than for EPC states. As a result, a greater proportion of a country's patenting activity will be reflected in the EPO data for a signatory state than for a non-signatory state like Norway.

Since Norway is not an EPO member, it makes sense to use domestic patent data to get a better idea of high-tech patenting in Norway. The compatibility of this approach with EPO data is not optimal either, but is expected to yield a more representative picture of the Norwegian high-tech patenting.

The total volume of Norwegian domestic patenting in 2000 was 830, according to the scoreboard methodology.[8] Inventors from Oslo and Akershus accounted for 283, or a little over a third of the total volume (see table 3).

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[7]The figures for GERD (mill. NOK) and BERD (mill. NOK) are from Science and Technology Indicators for Norway – 2003, forthcoming and the GDPR is from SSB- 2003 (http://www.ssb.no/emner/09/01/fnr/).

[8] Fractional counts are used to represent the contribution of individual inventors (for n inventors, each inventor counts 1/N).

Table 3: Norwegian patenting by inventor address: fractional count (2000)

County	Total
Oslo	150
Akershus	133
Rogaland	111
Hordaland	79
Sør-Trøndelag	70
Buskerud	48
Møre og Romsdal	44
Telemark	32
Vestfold	31
Østfold	29
Vest-Agder	23
Oppland	17
Aust-Agder	17
Troms	16
Hedmark	10
Nordland	7
Sogn Og Fjordane	7
Nord-Trøndelag	5
Finnmark	0
(blank)	1
Grand Total	830

Source: STEP and NPO

Thirteen percent (N=113) of the Norwegian patents were in the 'high-tech' area[9]. Table two illustrates how these patents breakdown according to the geographic association of the inventors. It shows that 53 percent of the high-tech patents was due to inventors in the Oslo Akershus area (see table 4).

Table 4: Norwegian high-tech patenting by inventor address: fractional count (2000)

County	Total
Akershus	30
Oslo	30
Sør-Trøndelag	11
Hordaland	10
Buskerud	8
Aust-Agder	7
Hedmark	3
Troms	3
Vestfold	3
Møre og Romsdal	2
Rogaland	2
Telemark	2
Østfold	1
Oppland	0
Finnmark	0
(blank)	1
Grand Total	113

Source: STEP and NPO

[9] Primary IPC classes were used.

As we see from table 2 the regional distribution of the patent applications assigned according to the address of the inventor in the Oslo-region were 60 in year 2000. The population in the Oslo-region was 974 519 in year 2000. This gives a NPO high–tech patent applications per million population for the Oslo-region like 61.6.

5.3 The Revealed Regional Summary Innovation Index for the Oslo region (RRSII)
We have now assembled all the indicators we need to calculate the RRSII (Revealed regional summary innovation index). We have calculated the index according to the method described in '2002 European Innovation Scoreboard – Technical paper No 3: EU Regions' and which is reproduced in chapter 2. We have assembled all the indicators and figures in table 5 and table 6.

Table 5: Oslo Regional Indicators

Name	Tertiary education	Lifelong learning	Medium/high-tech employment in manufacturing	High-tech employment in services	Public R&D	Business R&D	High-tech patent applications	GDP per capita	RNSII	RRSII
EU-average[10]	21.2	8.5	7.6	3.6	0.67	1.28	27.8			
Norway[11]	33.8 (2001)	14.2 (2001)	4.2 (2001)	4.4 (2001)	0.75 (1999)	0.95 (1999)	15.2 (2000) 25.3[12] (2000)			
Oslo/ Akershus	38.3 (2001)	14.2 (2001)	2.2 (2001)	8.0 (2001)	1.45 (2001)	1.58[13] (2001)	61.6 (2000)	372 217 (2000)	1.74	170

Source: EIS 2002, STEP, NPO, Register data 2001, Science and Technology Indicators for Norway 2003, Statistics Norway (SSB).

Table 6: Other Indicators

Name	GERD (mill. NOK)	BERD (mill. NOK)	GDPR (mill. NOK)
Oslo Region[14] (year 2000)	11 002,2	5 735	363 883

Source: Science and Technology Indicators for Norway 2003, Statistics Norway (SSB).

On the basis of our data, the RRSII-index for the Oslo-region is 170. This is a high score and puts the region on forth place over the 'Local' EU innovation leaders, according to table 1.

[10] These figures are from: 2002 European Innovation Scoreboard – Technical paper No 4: Sources: EUROASTAT, Labour Force Survey.
[11] These figures are from: 2002 European Innovation Scoreboard – Technical paper No 4: Sources: EUROASTAT, Labour Force Survey. The year is in brackets.
[12] This figure is build on our definition described above and is comparable with the figure for Oslo/ Akershus. The calculation is total NPO patents (113) per million population (0,974).
[13] Business R&D = (BERD Oslo Region (year 2001) = (Oslo county 3009,9 Mill NOK) + (Akershus county 2725,1 Mill. NOK)) /(GDPR (year 2000) = 363 883 mill.kr) = 1,58 %
[14] The figures for GERD (mill. NOK) and BERD (mill. NOK) are from Science and Technology Indicators for Norway – 2003, forthcoming and the GDPR is from SSB- 2003 (http://www.ssb.no/emner/09/01/fnr/).

6 Concluding remarks

According to our calculation and use of available databases the Revealed Regional Summary Innovation Index (RRSII) for the Oslo-region is 170. This index tries to locate local leaders by taking into account the regions relative performance within the EU and the region's relative performance within the country. Compared with other EU-regions in table 1, we se that the Oslo-region is doing very well.

Besides making an attempt to calculate the RRSII for the Oslo-region, we have not analysed this result any further.

We have to make a reservation concerning the data we have produced and how we have treated them. We also have to make a reservation for a possible misunderstanding on how the index is calculated. We have to the best of our knowledge used the definitions and descriptions displayed in ' 2002 European Innovation Scoreboard – Technical paper No 3: EU Regions' and '2002 European Innovation Scoreboard – Technical paper No 4: Indicators and Definitions. Due to the time and economic limit of this project, there has been no room for a detailed discussion of the data that has been produced. The RRSII index is a mix of different data sources and years and the consequence of this has neither been accounted for. The index must therefore be seen only as a first attempt and step to yield this kind of regional data for the Oslo-region. Due to the many uncertainties bound to this figure, this result must only be used as an indication.