KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

ZAGADNIENIA INNOWACYJNOŚCI FUNKCJONOWANIA SYSTEMU BADANIA + ROZWÓJ W NAUCE

Redaktor naukowy
ANTONI MIKLEWSKI

Tom I

Projekt: „INNOWACYJNE ZARZĄDZANIE SYSTEMEM B+R W JEDNOSTKACH NAUKOWYCH" jest współfinansowany ze środków Unii Europejskiej w ramach Europejskiego Funduszu Społecznego 4.2. "Rozwój kwalifikacji kadr systemu B+R i wzrost świadomości roli nauki w rozwoju gospodarczym"

Wyższa Szkoła Informatyki Stosowanej i Zarządzania, 01-447 Warszawa, ul. Newelska 6, tel.: 22 3486523

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Książka współfinansowana ze środków Unii Europejskiej w ramach Europejskiego Funduszu Społecznego.

Projekt Programu Operacyjnego Kapitał Ludzki.

„Innowacyjne zarządzanie systemem B+R w jednostkach naukowych"

Priorytet IV Szkolnictwo Wyższe i Nauka.

Działanie 4.2. Rozwój kwalifikacji kadr systemu B+R i wzrost świadomości roli nauki w rozwoju gospodarczym.

Podnoszenie umiejętności pracowników systemu B+R w zakresie zarządzania badaniami naukowymi i pracami rozwojowymi oraz komercjalizacji rezultatów prac badawczych – w tym również w zakresie ochrony własności intelektualnej i przemysłowej.

Projekt POKL.04.02.00-00-059/08

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ISBN 83-894-7542-1

EAN 9788389475428

Main and Regional Innovation Indicators – the *Case Study* of Poland and Germany[1]

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Introduction

European Commission introduced EIS – The European Innovation Scoreboard (Fig. 1, 2). EIS covers the 27 EU Member States, Croatia, Serbia, Turkey, the associate countries Iceland, Norway and Switzerland, as well as Australia, Canada, Israel, Japan and the US. The indicators of the EIS summarize the main elements of innovation performance. The EIS 2009 fully implements the list of indicators from the EIS 2008. The EIS has been published annually since 2001 to track and benchmark the relative innovation performance of EU27 Member States. From the EIS 2008 onwards the methodology has been revised and the number of dimensions increased to 7 and grouped into 3 main blocks covering enablers, firm activities and outputs. Table 1 shows the 7 main categories, the 29 indicators, and the primary data sources for each indicator.

ENABLERS captures the main drivers of innovation that are external to the firm as:

- Human resources – measures the availability of high-skilled and educated people.
- Finance and support – measures the availability of finance for innovation projects and the support of governments for innovation activities.

[1] Paper forms parts of the author's research projects: 1) international research project BMBF No MOE 06/R60 „Urban and peri-urban growth model in the Great Stuttgart Region" (2006-2008), 2) Research project „Land use land cover change on the peri-urban areas of Warsaw agglomeration and growth and development of MSE (2008-), 3) habilitation thesis „Applications of the systems analysis to modern problems of research, development, demonstration and deployment".

FIRM ACTIVITIES captures innovation efforts that firms undertake recognising the fundamental importance of firms' activities in the innovation process:

- Firm investments – covers a range of different investments firms make in order to generate innovations.
- Linkages & entrepreneurship – captures entrepreneurial efforts and collaboration efforts among innovating firms and also with the public sector.
- Throughputs – captures the Intellectual Property Rights (IPR) generated as a throughput in the innovation process and Technology Balance of Payments flows.

OUTPUTS captures the outputs of firm activities as:

- Innovators – measures the number of firms that have introduced innovations onto the market or within their organisations, covering technological and nontechnological innovations.
- Economic effects – captures the economic success of innovation in employment, exports and sales due to innovation activities.

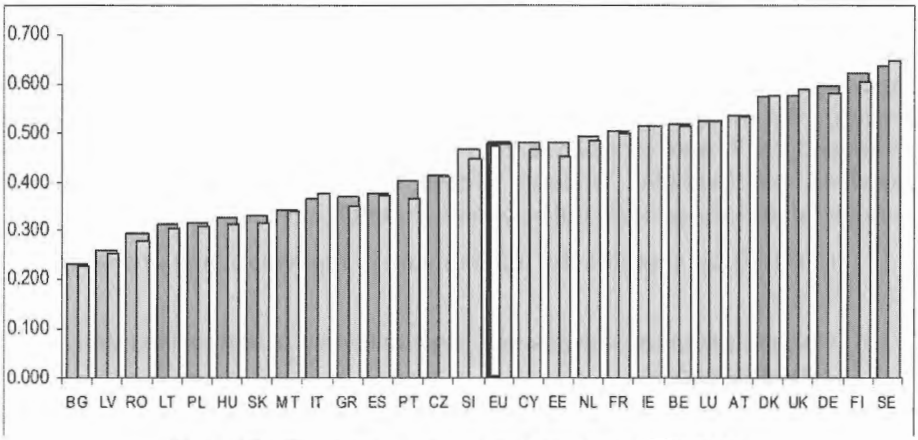


Fig. 1. The European Innovation Scoreboard. EIS 2009.
Source: http://www.proinno-europe.eu/.

Note: The Summary Innovation Index (SII) is a composite of 29 indicators going from a lowest possible performance of 0 to a maximum possible performance of 1. The 2009 SII reflects performance in 2007/2008 due to a lag in data availability. The grey coloured columns show 2008 performance as calculated backward from 2009 using the next-to-last data for each of the indicators. This 2008 performance is not identical to that shown in the EIS 2008 as not for all indicators data could be updated with one year. The difference between the columns for 2008 and 2009 show the most recent changes in innovation performance.

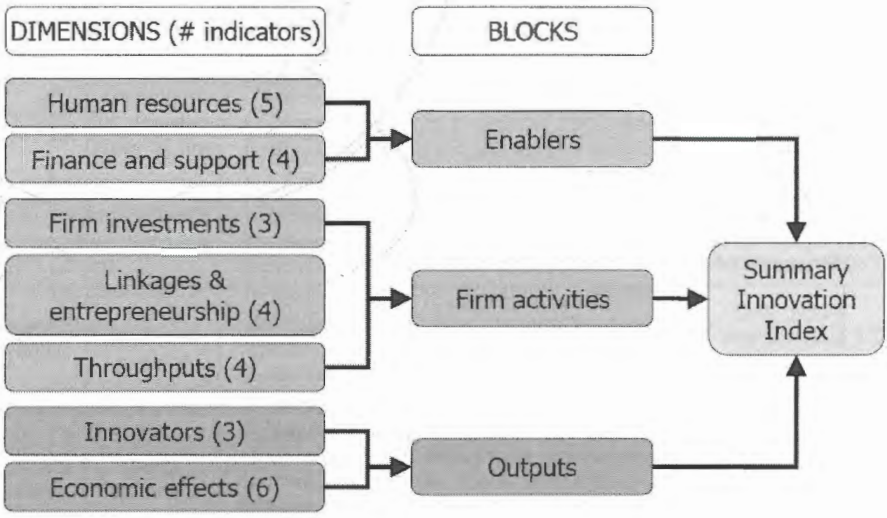


Fig. 2. New EIS methodology.

Table 1. The Structure of EIS 2008-2010.

	Indicators	Numerator	Denominator	Data source (ref. year)
ENABLERS				
	Human resources			
1.1.1	S&E and SSH graduates per 1000 population aged 20-29 (first stage of tertiary education)	Number of S&E (science and engineering) and SSH (social sciences and humanities) graduates at first stage of tertiary education (ISCED 5)	Population between 20 and 29 years	Eurostat (2007)
1.1.2	S&E and SSH doctorate graduates per 1000 population aged 25-34 (second stage of tertiary education)	Number of S&E (science and engineering) and SSH (social sciences and humanities) graduates at second stage of tertiary education (ISCED 6)	Population between 25 and 34 years	Eurostat (2007)
1.1.3	Population with tertiary education per 100 population aged 25-64	Number of persons in age class with some form of postsecondary education (ISCED 5 and 6)	Population between 25 and 64 years	Eurostat (2008)
1.1.4	Participation in life-long learning per 100 population aged 25-64	Number of persons involved in life-long learning. Life-long learning is defined as participation in any type of education or training course during the four weeks prior to the survey	Population between 25 and 64 years	Eurostat (2008)

1.1.5	Youth education attainment level (% of population aged 20-24 having completed at least upper secondary education)	Number of young people aged 20-24 years having attained at least upper secondary education attainment level, i.e. with an education level ISCED 3a, 3b or 3c long minimum	Population between 20 and 24 years	Eurostat (2008)
	Finance and support			
1.2.1	Public R&D expenditures (% of GDP)	All R&D expenditures in the government sector (GOVERD) and the higher education sector (HERD). Both GOVERD and HERD according to the Frascati-manual definitions	Gross Domestic Product	Eurostat (2008)
1.2.2	Venture capital (% of GDP)	Venture capital investment is defined as private equity being raised for investment in companies. Management buyouts, management buyins, and venture purchase of quoted shares are excluded. VC includes Early stage (seed + start-up) and Expansion and replacement (expansion and replacement capital) capital	Gross Domestic Product	EVCA/ Eurostat (2008)
1.2.3	Private credit (relative to GDP)	Claims on the private sector by commercial banks and other financial institutions that accept transferable deposits such as demand deposits (line 22d of IMF International Financial Statistics)	Gross Domestic Product (line 99b of IMF International Financial Statistics)	IMF (2008)
1.2.4	Broadband access by firms (% of firms)	Number of enterprises (excluding the financial sector) with 10 or more employees with broadband access	Total number of enterprises (excluding the financial sector) with 10 or more employees	Eurostat (2008)
FIRM ACTIVITIES				
	Firm investments			
2.1.1	Business R&D expenditures (% of GDP)	All R&D expenditures in the business sector (BERD), according to the Frascati-manual definitions	Gross Domestic Product	Eurostat (2008)
2.1.2	IT expenditures (% of GDP)	Total expenditures on IT. IT expenditures capture hardware, software and other services. The data cover the total market, including expenditure of the public and private sector (enterprises, as well as those of individuals and households)	Gross Domestic Product	EITO/ Eurostat (2006)
2.1.3	Non-R&D innovation expenditures (% of turnover)	Sum of total innovation expenditure for enterprises, in national currency and current prices excluding intramural and extramural R&D expenditures	Total turnover for all enterprises	Eurostat (2006)

	Linkages & entrepreneurship			
2.2.1	SMEs innovating in-house (% of all SMEs)	Sum of SMEs with in-house innovation activities. Innovative firms are defined as those firms which have introduced new products or processes either 1) in-house or 2) in combination with other firms	Total number of SMEs	Eurostat (2006)
2.2.2	Innovative SMEs collaborating with others (% of all SMEs)	Sum of SMEs with innovation co-operation activities. Firms with co-operation activities are those that had any cooperation agreements on innovation activities with other enterprises or institutions in the three years of the survey period	Total number of SMEs	Eurostat (2006)
2.2.3	Firm renewal (SME entries plus exits) (% of SMEs)	Sum of the number of births and deaths of SMEs. Only SMEs with at least 5 employees and who are active in NACE classes C, D, E, G51, I, J and K are included	Total number of SMEs	Eurostat (2005)
2.2.4	Public-private co-publications per million population	Number of public-private co-authored research publications in the Web of Science database. The definition of the "private sector" excludes the private medical and health sector. Publications are assigned to the country/countries in which the business companies or other private sector organisations are located	Total population	Thomson Reuters / CWTS (2007)
	Throughputs			
2.3.1	EPO patents per million population	Number of patents applied for at the European Patent Office (EPO), by year of filing. The national distribution of the patent applications is assigned according to the address of the inventor	Total population	Eurostat (2006)
2.3.2	Community trademarks per million population	Number of new community trademarks. A trademark is a distinctive sign, identifying certain goods or services as those produced or provided by a specific person or enterprise	Total population	OHIM / Eurostat (2008)
2.3.3	Community designs per million population	Number of new community designs. A registered Community design is an exclusive right for the outward appearance of a product or part of it, resulting from the features of, in particular, the lines, contours, colours, shape, texture and/or materials of the product itself and/or its ornamentation	Total population	OHIM / Eurostat (2008)
2.3.4	Technology Balance of Payments flows (% of GDP)	Royalty and license fees, receipts (Balance of Payments, current US$) plus Royalty and license fees, payments (Balance of Payments, current US$)	Gross Domestic Product (current US$)	World Bank (2008)
OUTPUTS				
	Innovators			
3.1.1	SMEs introducing product or process innovations (% of SMEs)	Number of SMEs who introduced a new product or a new process to one of their markets	Total number of SMEs	Eurostat (2006)

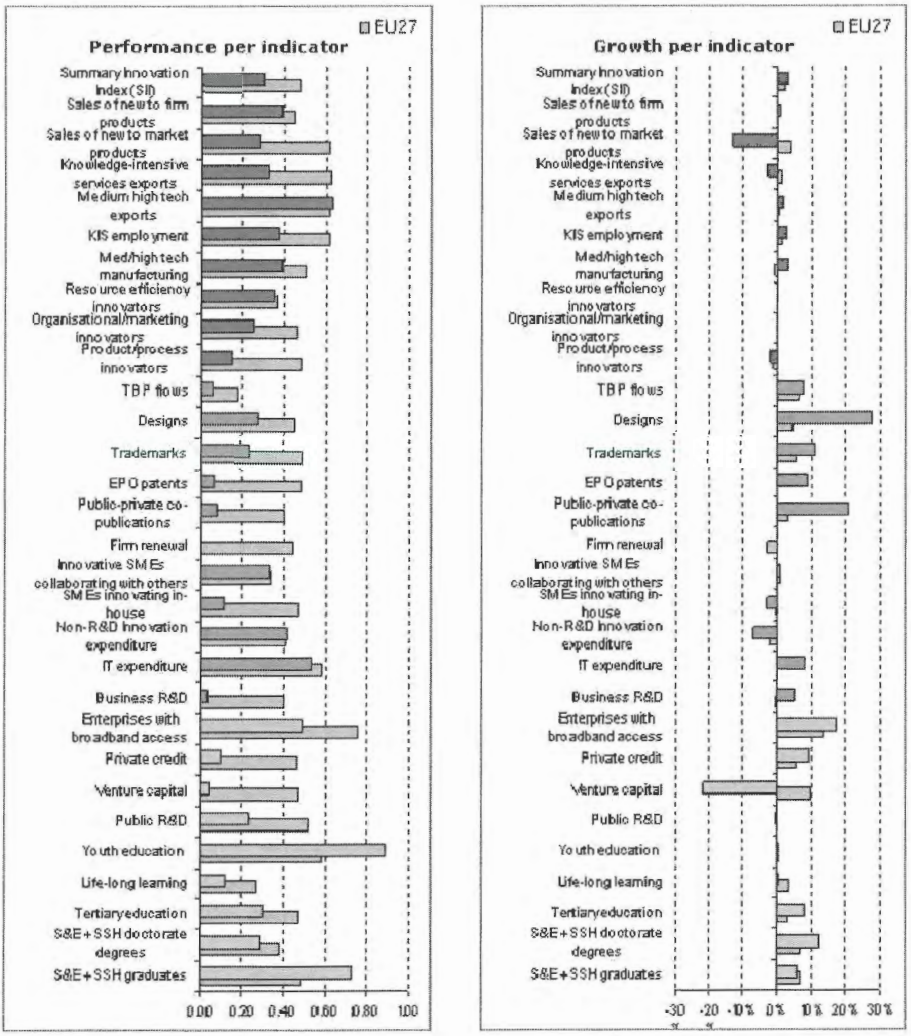
3.1.2	SMEs introducing marketing or organisational innovations (% of SMEs)	Number of SMEs who introduced a new marketing innovation and/or organisational innovation to one of their markets	Total number of SMEs	Eurostat (2006)
3.1.3	Resource efficiency innovators, calculated as the unweighted average of the following 2 indicators: • Share of innovators where innovation has significantly reduced labour costs (% of firms) • Share of innovators where innovation has significantly reduced the use of materials and energy (% of firms)	Number of innovating firms who replied that their product or process innovation had a highly important effect on reducing labour costs per unit of output Number of innovating firms who replied that their product or process innovation had a highly important effect on reducing materials and energy per unit of output	Total number of innovating firms Total number of innovating firms	Eurostat (2006) Eurostat (2006)
	Economic effects			
3.2.1	Employment in medium-high & high-tech manufacturing (% of workforce)	Number of employed persons in the medium-high and hightech manufacturing sectors	Total workforce	Eurostat (2008)
3.2.2	Employment in knowledge-intensive services (% of workforce)	Number of employed persons in the knowledge-intensive services sectors	Total workforce	Eurostat (2008)
3.2.3	Medium and high-tech manufacturing exports (% of total exports)	Value of medium and high-tech exports	Value of total exports	UN (2008)
3.2.4	Knowledge-intensive services exports (% of total services exports)	Exports of knowledge-intensive services are measured by the sum of credits in EBOPS (Extended Balance of Payments Services Classification) 207, 208, 211, 212, 218, 228, 229, 245, 253, 254, 260, 263, 272, 274, 278, 279, 280 and 284	Total services exports as measured by credits in EBOPS 200	UN / Eurostat (2007)
3.2.5	New-to-market sales (% of turnover)	Sum of total turnover of new or significantly improved products for all enterprises	Total turnover for all enterprises	Eurostat (2006)
3.2.6	New-to-firm sales (% of turnover)	Sum of total turnover of new or significantly improved products to the firm but not to the market for all enterprises	Total turnover for all enterprises	Eurostat (2006)

Source: http://www.proinno-europe.eu/.

Acronyms and abbreviations: S&E – Science and engineering, SSH – Social Sciences and humanities, ISCED – International Standard Classification of Education, R&D – Research and Development, SME – Small and Medium Enterprise, GDP – Global

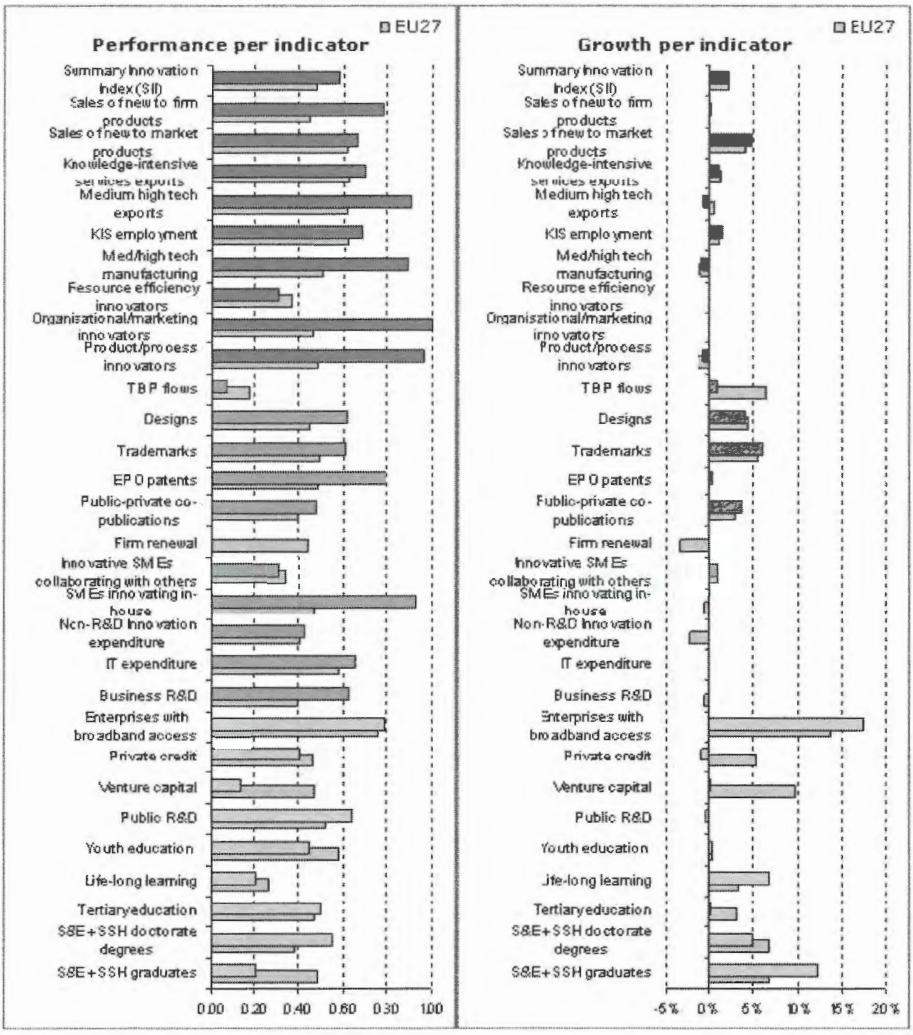
Domestic Product, EPO – European Patent Office, USPTO – United States Patent and Trademark Office, OHIM – Office for Harmonization in the Internal Market, CIS – Community Innovation Survey.

Table 2. Poland – Summary Innovation Index (SII) – The Breakdown.



Source: http://www.proinno-europe.eu/.

Table 3. Germany – Summary Innovation Index – The Breakdown.



Source: http://www.proinno-europe.eu/.

The EIS country pages provide for selected European countries covered by the EIS 2009 a performance chart showing performance by indicator relative to the EU mean (Fig. 3), a chart showing the innovation performance for each of the innovation dimensions relative to the country's SII performance (Fig. 4) and the data tables showing, where available, time series data for the SII (Summary Innovation Index), the dimensions and each of the indicators (Tab. 2 and Tab. 3).

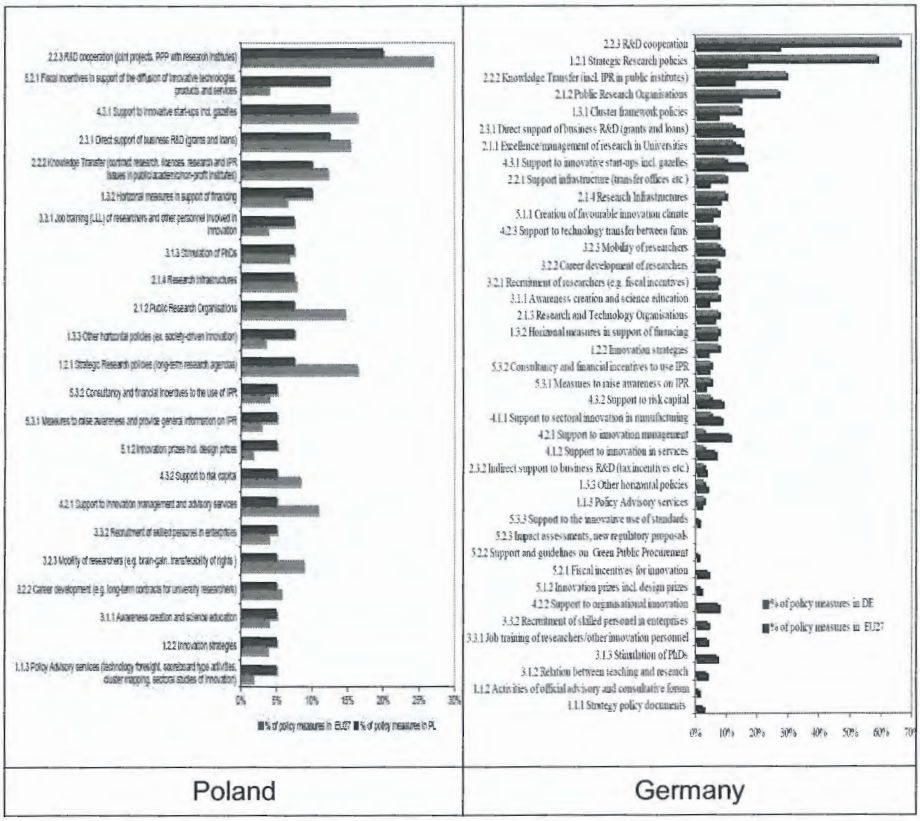
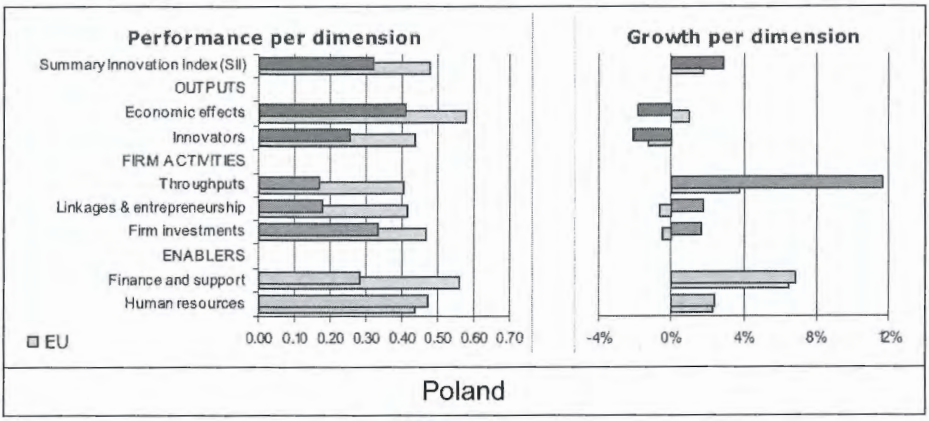


Fig. 3. Policy priorities addressed by the support measures in Poland and Germany (relative to EU 27). Source: TrendChart-ERAWATCH data base, http://cordis.europa.eu/erawatch/index.cfm.



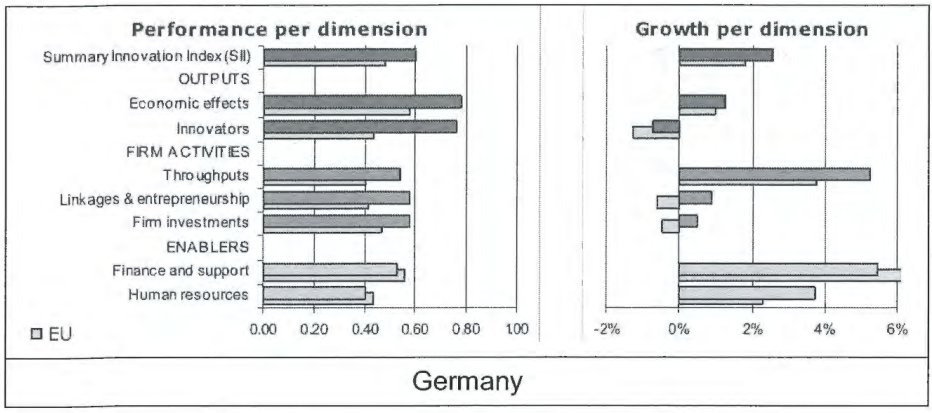


Fig. 4. Performance chart by innovation dimension.
Source: http://www.proinno-europe.eu/.

Next chapter presents very interesting comparisons of the selected regions Poland and Germany.

1. Main indicators related to R&D in Poland and Germany

Author selects following regions: Germany, Baden-Württemberg, Stuttgart, Berlin, Mecklenburg-Vorpommern, Euro area, European Union 15, European Union 27, Poland, Mazowieckie, Wielkopolskie, Zachodniopomorskie and investigates following indicators:

1. Total intramural R&D expenditure (GERD) by sectors of performance and region – Percentage of GDP (Tab. 4).
2. Total intramural R&D expenditure (GERD) by sectors of performance and region – Total (Millions of euro (from 1.1.1999)/Millions of ECU (up to 31.12.1998)) (Tab. 5).
3. Total intramural R&D expenditure (GERD) by sectors of performance and region – Business enterprise sector, Percentage of GDP (Tab. 6).
4. Total intramural R&D expenditure (GERD) by sectors of performance and region – Business enterprise sector, Millions of euro (from 1.1.1999)/Millions of ECU (up to 31.12.1998) (Tab. 7).
5. Total intramural R&D expenditure (GERD) by sectors of performance and region – Higher education sector, Percentage of GDP (Tab. 8).
6. Total intramural R&D expenditure (GERD) by sectors of performance and region – Higher education sector, Millions of euro (from 1.1.1999)/Millions of ECU (up to 31.12.1998) (Tab. 9).

Conclusions are clear. Stuttgart and Berlin regions are "Knowledge and learning regions". In 2006 in the EU27, 12 million workers were employed in

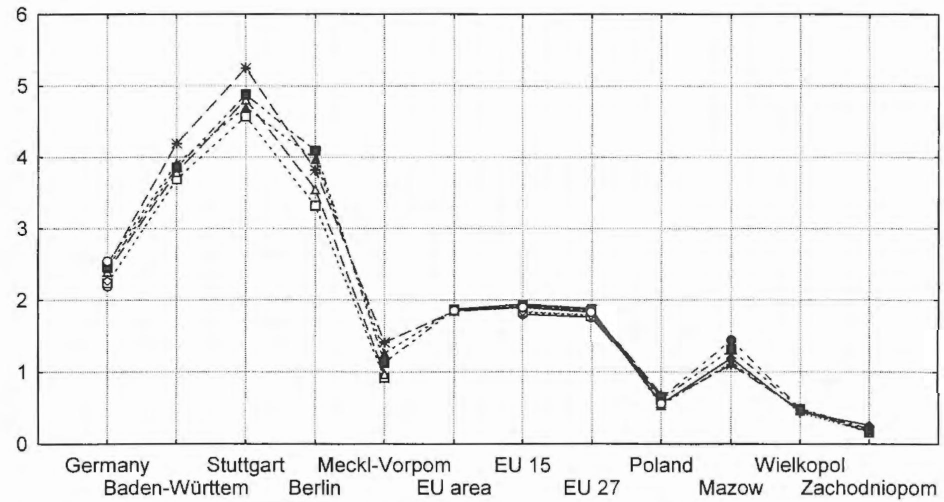
medium high-tech manufacturing4 and 2.3 million in hightech manufacturing4, the equivalent of 5.5% and 1.1% respectively of total employment.

The leading region in the EU27 and EFTA in terms of employment in high- and medium high-tech manufacturing was Lombardia in Italy with 448 000 people employed in 2006, followed by Stuttgart in Germany (377 000) and Cataluña in Spain (286 000). Germany dominated the top 20 list with eleven regions, followed by Italy (5) and France (2).

Stuttgart had the highest relative employment in high- and medium high-tech manufacturing with 19.9% of total employment, followed by Karlsruhe (17.2%) also in Germany. In the top 20 list, Germany had eleven regions, including the eight highest positions, followed by the Czech Republic (4), France and Hungary (2 each).

Table 4. Total intramural R&D expenditure (GERD) by sectors of performance and region - Percentage of GDP.

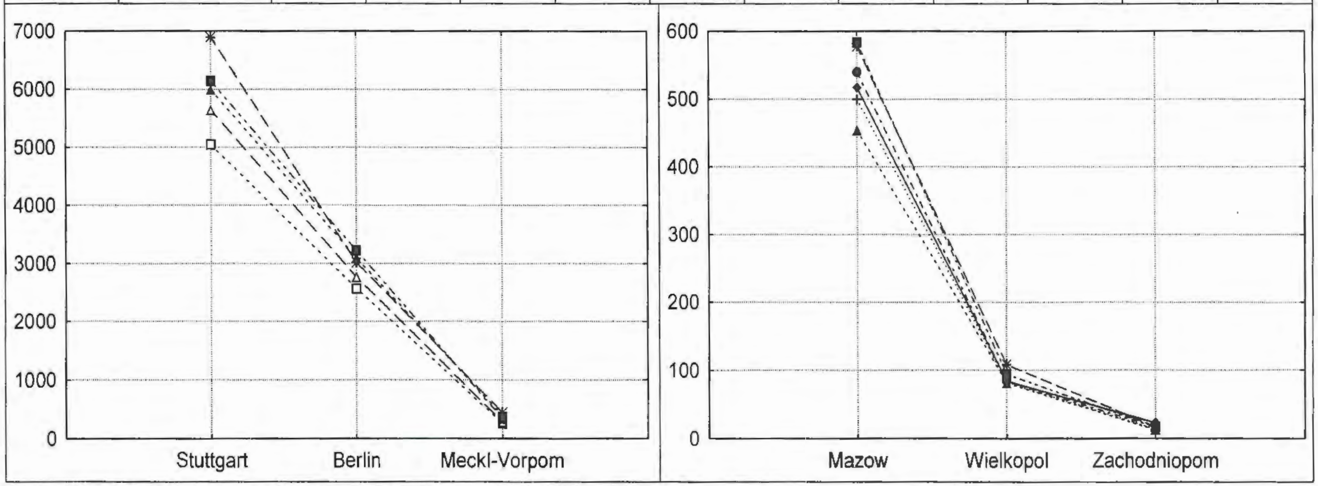
geo/time	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Germany	2.19	2.24	2.27	2.40	2.45	2.46	2.49	2.52	2.49	2.48	2.55
Baden-Württemberg		3.69		3.79		3.85		3.91		4.19	
Stuttgart		4.57		4.81		4.88		4.70		5.25	
Berlin		3.32		3.55		4.09		3.97		3.82	
Mecklenburg-Vorpommern		0.92		0.97		1.13		1.26		1.41	
Euro area					1.84	1.86	1.87	1.86	1.85	1.84	1.85
European Union 15	1.80	1.83	1.84	1.90	1.91	1.93	1.94	1.93	1.89	1.90	1.90
European Union 27	1.76	1.78	1.79	1.84	1.86	1.87	1.88	1.86	1.83	1.83	1.83
Poland	0.65	0.65	0.67	0.69	0.64	0.62	0.56	0.54	0.56	0.57	0.56
Mazowieckie					1.44	1.31	1.19	1.13	1.19	1.10	
Wielkopolskie					0.49	0.48	0.44	0.46	0.43	0.47	
Zachodniopomorskie					0.21	0.19	0.26	0.16	0.17	0.17	



Source: Own investigations on the own projects basis and CORDIS

Table 5. Total intramural R&D expenditure (GERD) by sectors of performance and region - Total (Millions of euro (from 1.1.1999)/Millions of ECU (up to 31.12.1998)).

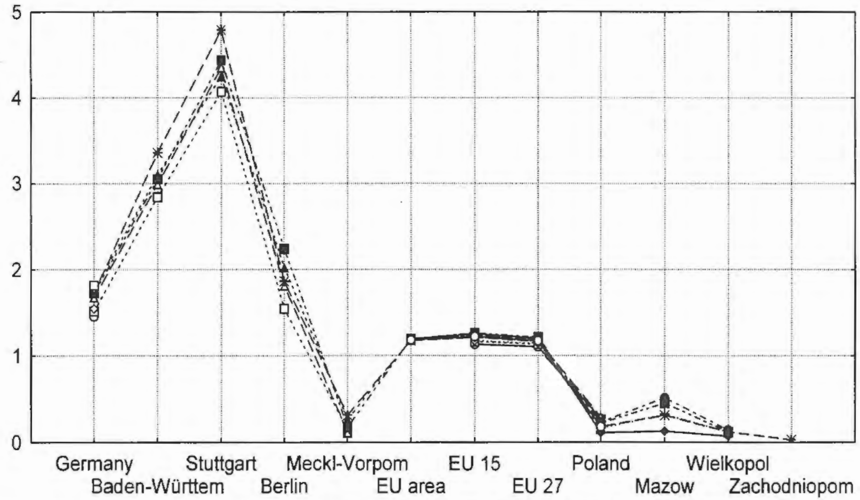
geo/time	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Germany	42167.83	42671.15	44347.76	48190.74	50619.00	52002.00	53363.75	54538.50	54966.90	55739.04	42167.83
Baden-Württemberg		9983.55		10978.00		11919.00		12301.15		13680.99	
Stuttgart		5045.20		5643.00		6146.00		5996.40		6896.20	
Berlin		2565.76		2765.00		3222.00		3096.15		3017.87	
Mecklenburg-Vorpommern		265.48		290.00		346.00		392.78		447.40	
Euro area					124360.00	131078.99	136586.14	140130.02	144330.20	149309.88	
European Union 15	127269.42	136215.69	143144.95	155063.35	167314.07	174891.39	182018.50	184002.65	189254.53	196922.20	127269.42
European Union 27	129457.74	138693.29	145864.95	157833.18	170503.46	178549.05	185872.09	187800.30	193439.93	202017.52	129457.74
Poland	806.88	904.59	1022.62	1085.89	1196.57	1322.95	1172.29	1036.05	1138.84	1385.66	806.88
Mazowieckie					539.87	583.15	517.01	454.02	499.62	577.38	
Wielkopolskie					84.15	94.03	84.15	81.42	82.31	108.25	
Zachodniopomorskie					17.29	17.43	23.49	13.12	14.16	17.40	



Source: Own investigations on the own projects basis and CORDIS

Table 6. Total intramural R&D expenditure (GERD) by sectors of performance and region - Business enterprise sector, Percentage of GDP.

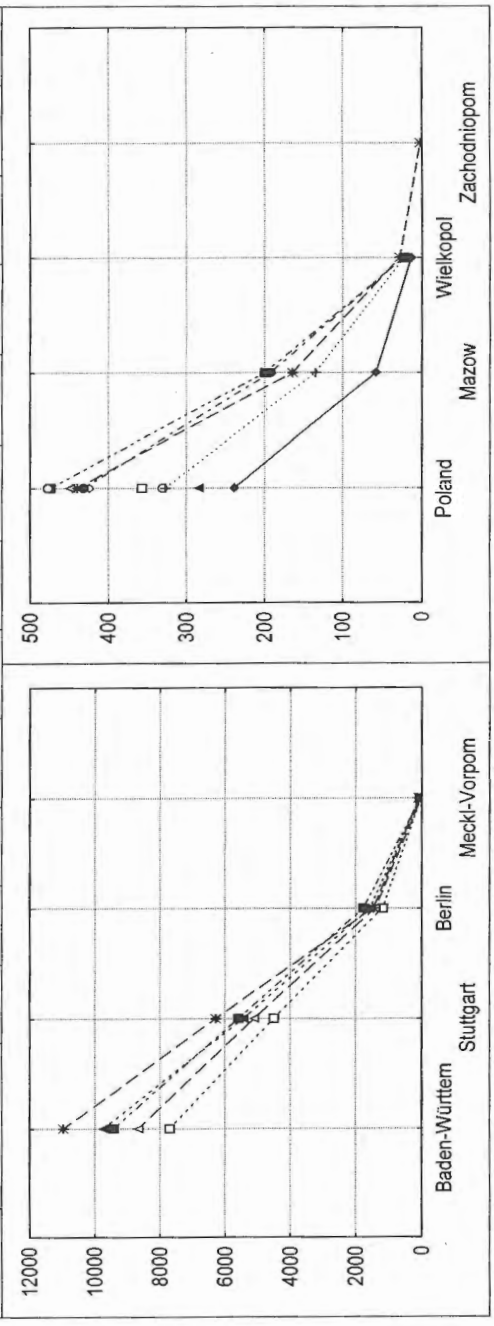
geo/time	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Germany	1.45	1.51	1.54	1.67	1.73	1.72	1.72	1.76	1.73	1.72	1.78	1.81
Baden-Württemberg		2.84		2.99		3.05		3.10		3.36		
Stuttgart		4.07		4.35		4.44		4.25		4.79		
Berlin		1.54		1.81		2.24		2.02		1.86		
Mecklenburg-Vorpommern		0.14		0.11		0.17		0.26		0.31		
Euro area					1.18	1.19	1.19	1.18	1.17	1.17	1.18	
European Union 15	1.13	1.16	1.17	1.23	1.25	1.26	1.25	1.24	1.21	1.21	1.22	
European Union 27	1.10	1.13	1.14	1.19	1.20	1.21	1.20	1.19	1.16	1.16	1.17	
Poland	0.27	0.26	0.28	0.29	0.23	0.22	0.11	0.15	0.16	0.18	0.18	
Mazowieckie					0.51	0.45	0.13		0.32	0.31		
Wielkopolskie					0.14	0.12	0.07	0.11	0.12	0.12		
Zachodniopomorskie										0.03		



Source: Own investigations on the own projects basis and CORDIS

Table 7. Total intramural R&D expenditure (GERD) by sectors of performance and region – Business enterprise sector, Millions of euro (from 1.1.1999)/Millions of ECU (up to 31.12.1998).

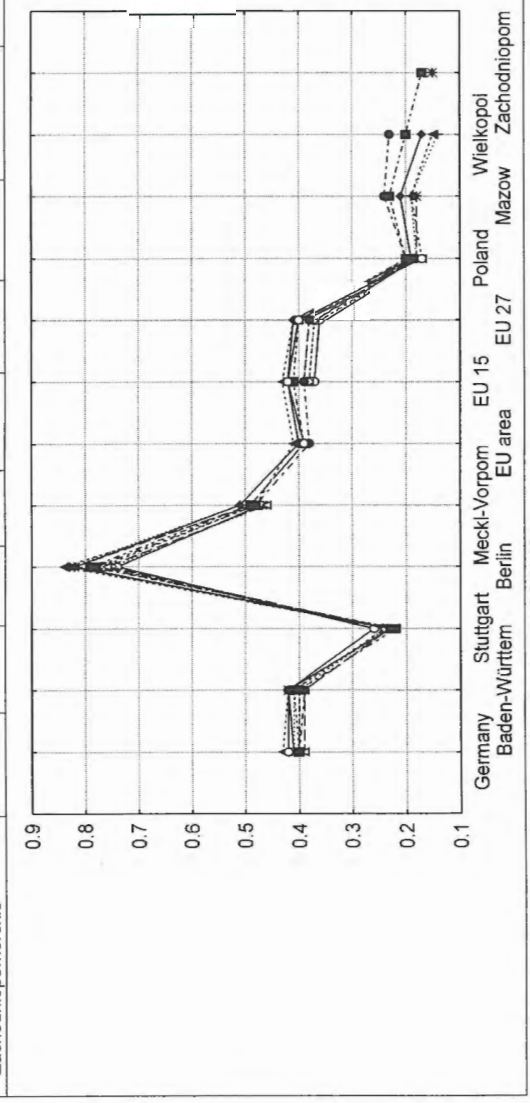
geo/time	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Germany	27871.56	28783.15	30129.56	33622.55	35600.00	36331.90	36950.00	38029.00	38363.00	38651.04	41148.00	42840.00
Baden-Württemberg		7699.92		8663.00		9434.00		9750.23		10966.00		
Stuttgart		4498.70		5104.00		5586.00		5431.66		6286.00		
Berlin		1188.07		1410.00		1766.00		1575.26		1473.00		
Mecklenburg-Vorpommern		40.21		33.00		53.00		81.61		97.00		
Euro area		40.21		33.00		53.00		81.61		97.00		
European Union 15					79879.00	83872.32	86675.64	88787.97	91628.66	94564.83	100017.55	
European Union 27	81023.38	87666.20	92435.77	101926.41	110557.38	115689.42	119127.24	119815.32	123177.84	128068.15	135716.18	
Poland	330.22	356.64	424.13	448.81	431.79	474.03	238.48	284.05	326.63	440.00	476.99	
Mazowieckie					192.06	199.45	57.97		135.00	164.26		
Wielkopolskie					23.93	22.85	14.05	19.36	23.02	28.01		
Zachodniopomorskie										2.56		



Source: Own investigations on the own projects basis and CORDIS

Table 8. Total intramural R&D expenditure (GERD) by sectors of performance and region – Higher education sector, Percentage of GDP.

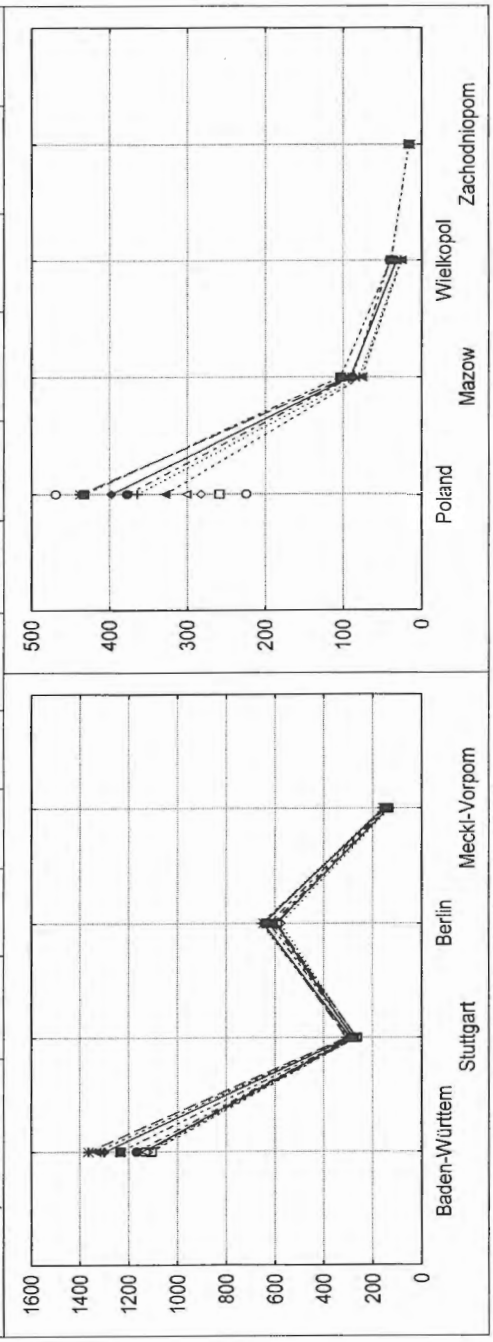
geo/time	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Germany	0.41	0.40	0.40	0.39	0.40	0.40	0.42	0.43	0.41	0.41	0.42
Baden-Wurttemberg	0.42	0.41	0.40	0.39	0.39	0.40	0.42	0.42	0.41	0.42	
Stuttgart	0.26	0.24	0.24	0.23	0.23	0.22	0.23	0.23	0.23	0.23	
Berlin	0.74	0.77	0.75	0.76	0.78	0.79	0.82	0.84	0.83	0.82	
Mecklenburg-Vorpommern	0.47	0.48	0.46	0.46	0.48	0.49	0.51	0.48	0.51	0.49	
Euro area					0.38	0.39	0.40	0.41	0.40	0.39	0.39
European Union 15	0.37	0.38	0.38	0.39	0.39	0.41	0.42	0.43	0.42	0.42	0.42
European Union 27	0.36	0.37	0.37	0.38	0.38	0.40	0.41	0.41	0.40	0.40	0.40
Poland	0.18	0.19	0.18	0.19	0.20	0.20	0.19	0.17	0.18	0.18	0.17
Mazowieckie					0.24	0.23	0.21	0.19	0.19	0.18	
Wielkopolskie					0.23	0.20	0.17	0.15	0.14		
Zachodniopomorskie						0.17				0.15	



Source: Own investigations on the own projects basis and CORDIS

Table 9. Total intramural R&D expenditure (GERD) by sectors of performance and region – Higher education sector, Millions of euro (from 1.1.1999)/Millions of ECU (up to 31.12.1998).

geo/time	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Germany	7838.06	7643.16	7715.59	7936.63	8146.10	8524.20	9080.36	9202.10	9089.46	9221.10	9600.00
Baden-Württemberg	1139.58	1106.88	1120.29	1133.00	1168.00	1235.00	1299.00	1333.80	1302.33	1365.00	
Stuttgart	281.76	266.06	269.15	267.00	278.00	278.00	291.00	296.69	292.09	306.00	
Berlin	597.54	594.26	576.91	593.00	610.00	624.00	648.00	656.59	653.95	646.00	
Mecklenburg-Vorpommern	137.21	137.95	131.02	138.00	143.00	150.00	157.00	150.25	161.05	157.00	
Euro area					25599.15	27522.71	29327.81	30529.12	30905.01	31661.58	32945.09
European Union 15	26349.96	28576.78	29800.77	31556.09	34414.57	37019.54	39886.86	40849.47	41792.80	43295.22	45249.95
European Union 27	26763.75	29058.34	30342.29	32136.72	35160.00	37914.00	40838.11	41746.97	42773.18	44534.51	46665.81
Poland	224.56	258.89	282.57	301.44	377.33	432.97	397.57	328.64	363.90	437.56	468.93
Mazowieckie					88.47	103.70	90.94	76.26	79.75	93.69	
Wielkopolskie					40.37	39.19	31.84	25.87	26.44		
Zachodniopomorskie						16.26				14.81	



Source: Own investigations on the own projects basis and CORDIS

3. EIS approach to innovation performance – conclusion

Author describes below comparison between Poland and Germany.

Poland's innovation performance has increased relative to the EU average trend over the past five years. If current trends continue it would reach the EU average level of performance within twenty years. Over the past five years, the trend in Germany's overall performance has been about the same as the EU average trend.

Poland has a level of innovation performance that places it in the group of "moderate innovators". Other EU countries in this group with similar overall levels of performance are Czech Republic, Greece, Hungary, Italy, Lithuania, Malta, Norway, Portugal, Slovakia and Spain. Germany's overall innovation performance places it among the group of "innovation leaders". Other EU countries in this group are Sweden, which shows the highest level of innovation performance, and Denmark, Finland, Switzerland and the UK.

Poland has a relatively even level of performance across the seven dimensions of innovation. It shows relative strengths in the indicators of Human resources, Firm investment, and Economic effect. It is well below the EU average on the indicators of Linkage & entrepreneurship, Throughputs and Innovators. Germany shows relative strengths in Innovators and Economic effects. However, it is below the EU average in Human resources, Finance and support and Throughputs.

The analysis indicates that Poland is below average in its efficiency of transforming innovation inputs into outputs. Germany shows one of the highest efficiencies in the EU in terms of transforming innovation inputs into outputs.

Sweden, Finland, Denmark, Germany and UK are the most innovative EU countries and ahead of the US. Based on their innovation performance, the countries included in the EIS 2009 fall into the following country groups:

- The innovation leaders include Denmark, Finland, Germany, Israel, Japan, Sweden, Switzerland, the UK and the US. Sweden is the most innovative country, largely due to strong innovation inputs although it is less efficient than some other countries in transforming these into innovation outputs.
- The innovation followers include Austria, Belgium, Canada, France, Iceland, Ireland, Luxembourg and the Netherlands.
- The moderate innovators include Australia, Cyprus, Czech Republic, Estonia, Italy, Norway, Slovenia and Spain.
- The catching-up countries include Bulgaria, Croatia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania and Slovakia. Turkey currently performs below the other countries.

These country groups appear to have been relatively stable over the last five years. Within these groups, countries have changed their relative ranking but it is rare for a country to have moved between groups. Only Luxembourg seems to be on the verge of entering the group of innovation leaders. Czech Republic, Estonia and Lithuania are on track to reach the EU average within a decade.

2. Innovation Union Scoreboard (IUS) approach – conclusion

Actually is the second edition of the Innovation Union Scoreboard (IUS) [3]. Based on the previous European Innovation Scoreboard (EIS), the tool is meant to help monitor the implementation of the Europe 2020 Innovation Union flagship by providing a comparative assessment of the innovation performance of the EU27 Member States, as well as for Croatia, Iceland, the Former Yugoslav Republic of Macedonia, Norway, Serbia, Switzerland and Turkey, and the relative strengths and weaknesses of their research and innovation systems (Fig. 5).

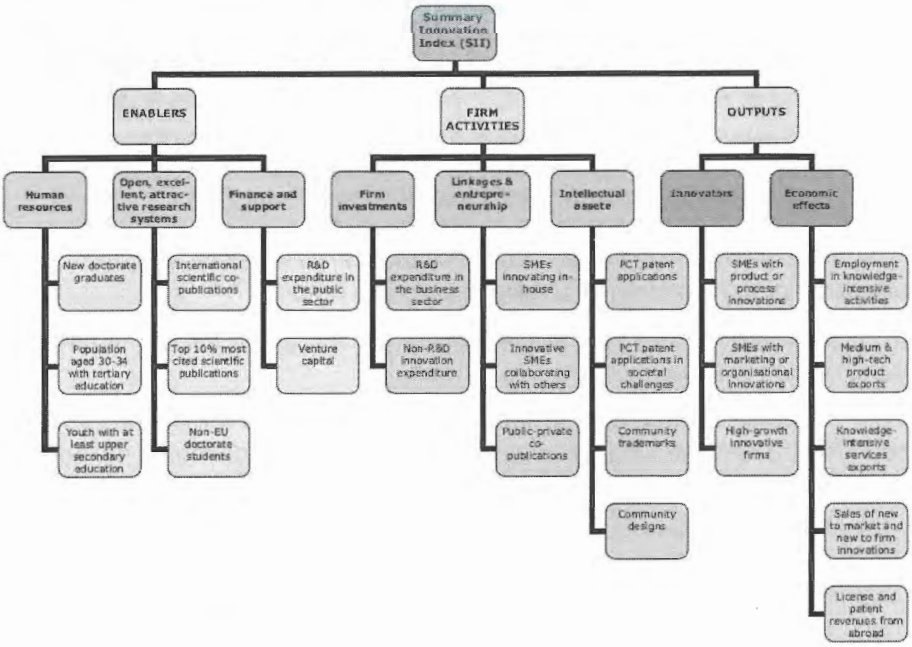


Fig. 5. 25 main IUS indicators [3, p. 6].

The **Enablers** capture the main drivers of innovation performance external to the firm and cover 3 innovation dimensions: 'Human resources', 'Open, excellent and attractive research systems' as well as 'Finance and support'.

Firm activities capture the innovation efforts at the level of the firm, grouped in 3 innovation dimensions: 'Firm investments', 'Linkages & entrepreneurship' and 'Intellectual assets'.

Outputs cover the effects of firms' innovation activities in 2 innovation dimensions: 'Innovators' and 'Economic effects'.

The current composite indicator (Fig. 6) consists of 24 individual indicators since the last indicator on "High-growth innovative enterprises as a percentage of all enterprises" is being developed.

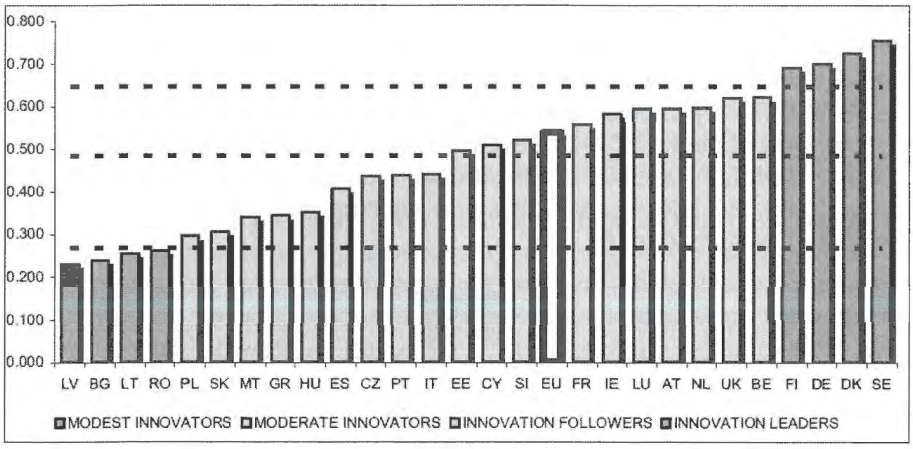


Fig. 6. EU Member States' innovation performance [3, p. 7].

The analysis indicates that **Poland** is still below average in its efficiency of transforming innovation inputs into outputs.

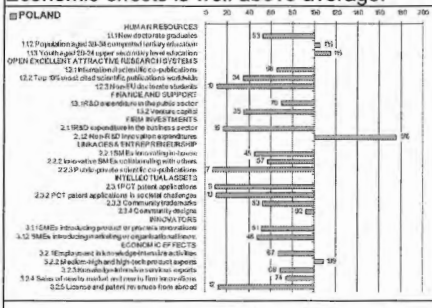
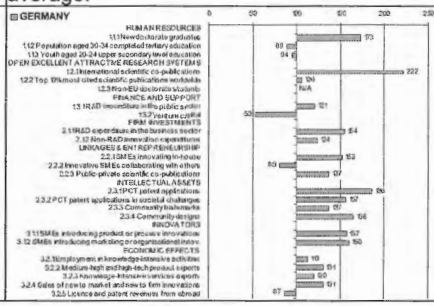
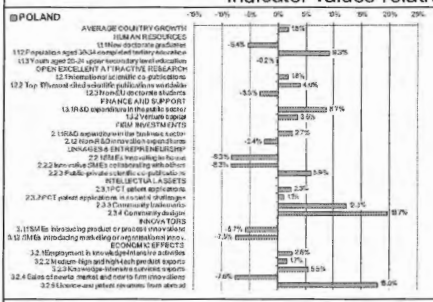
Germany shows one of the highest efficiencies in the EU in terms of transforming innovation inputs into outputs.

Sweden, Denmark, **Germany** and Finland are the most innovative EU countries. Based on their innovation performance, the countries included in the IUS 2011 fall into the following country groups:

- The innovation leaders include Sweden, Denmark, **Germany** and Finland.
- The innovation followers include Belgium, UK, Netherlands, Austria, Luxembourg, Ireland, France, Slovenia, Cyprus, and Estonia.
- The moderate innovators include Italy, Portugal, Czech Republic, Spain, Hungary, Greece, Malta, Slovakia and **Poland**.
- The modest innovators countries include Romania, Lithuania, Bulgaria and Latvia.

Table 10 and 11 show the comparison between Poland and Germany.

Table 10. Comparison between Poland and Germany (selected indicators).

Poland	Germany
Poland is one of the moderate innovators with a below average performance. Relative strengths are in Human resources, Finance and support, Firm investments and Economic effects. Relative weaknesses are in Open, excellent and attractive research systems, Linkages & entrepreneurship, Intellectual assets and Innovators. High growth is observed for Community designs and License and patent revenues from abroad. A relatively strong decline is observed for SMEs innovating in-house and Innovative SMEs collaborating with others. Growth performance in Intellectual assets and Economic effects is well above average.	**Germany** is one of the innovation leaders with an above average performance. Relative strengths are in Intellectual assets and Innovators. Relative weaknesses are in Human resources, Open, excellent and attractive research systems, Finance and support and Linkages & entrepreneurship. High growth is observed for Community trademarks, License and patent revenues from abroad and International scientific co-publications. A strong decline is observed for Non-R&D innovation expenditure. Growth performance in Open, excellent and attractive research systems and Intellectual assets is well above average.
	
Indicator values relative to the EU27 (EU27=100)	
	
Annual average growth per indicator and average country growth	

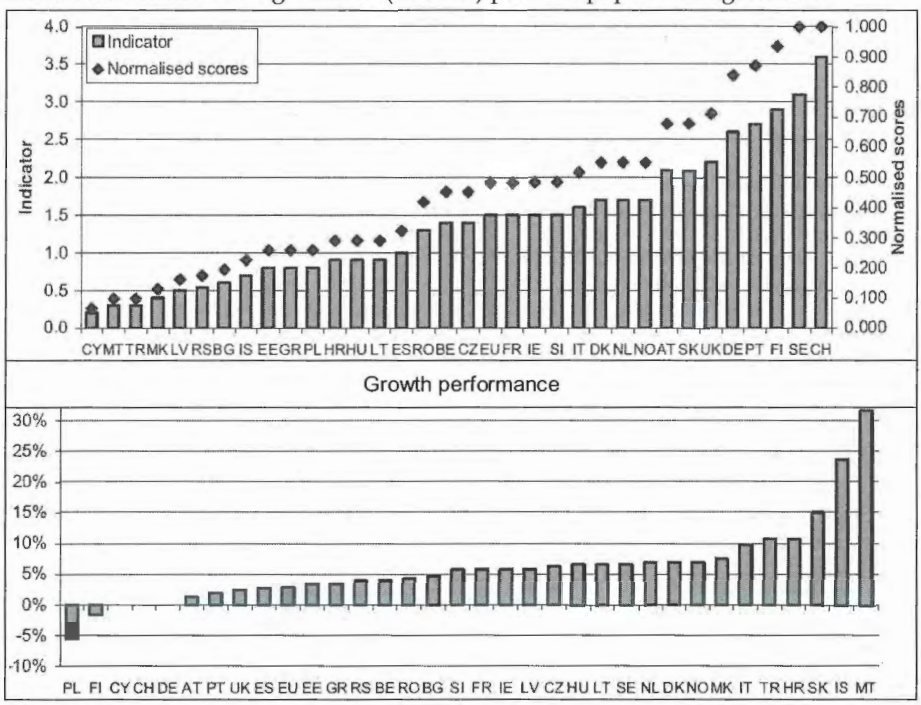
Source: [3].

The indicator **Growth performance for New doctorate graduates per 1000 population aged 25-34** is a measure of the supply of new second-stage tertiary graduates in all fields of training.

The average rate for the EU27 was 1.5. Malta and Iceland have been rapidly increasing their graduation rates over the last 5 years.

Graduation rates have declined in Finland and Poland.

Table 11. New doctorate graduates (ISCED6) per 1000 population aged 25-34.



Source: [3].

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Program Operacyjny Kapitał Ludzki **Priorytet IV Szk**

Działanie 4.2: Rozwój kwalifikacji kadr systemu B+R i wzrost świadomoś
gospodarczym. Podniesienie umiejętności pracowników systemu B+R w zakres
naukowymi i pracami rozwojowymi oraz komercjalizacji rezultatów prac bada
w zakresie ochrony własności intelektualnej i przemysłowej.

Projekt POKL.04.02.00-00-059/08:
Innowacyjne zarządzanie systemem B+R w jednostkach naukowych.
Projekt wpisuje się w realizację unijnej strategii wzrostu Europa 2020.

W zmieniającym się świecie UE potrzebna jest inteligentna i zrównoważona gospodarka sprzyjająca włączeniu społecznemu.

Inteligentny rozwój oznacza uzyskanie lepszych wyników w dziedzinie:

- **edukacji** (zachęcanie do nauki, studiów i podnoszenia kwalifikacji),
- **badań naukowych/innowacji** (stworzenie nowych produktów i usług, które wpłynęłyby na zwiększenie wzrostu gospodarczego i zatrudnienia oraz pomogłyby w rozwiązywaniu problemów społecznych),
- **społeczeństwa cyfrowego** (wykorzystanie technologii informacyjnych i komunikacyjnych).

Unijne cele służące zapewnieniu inteligentnego rozwoju obejmują:

1. zwiększenie łącznego poziomu **inwestycji publicznych i prywatnych do wysokości 3 proc. unijnego PKB**, a także zapewnienie lepszych warunków dla badań i rozwoju oraz innowacji,
2. **podwyższenie wskaźnika zatrudnienia kobiet i mężczyzn w wieku 20–64 lat do 75 proc.** do 2020 r. poprzez wprowadzenie większej liczby osób na rynek pracy, zwłaszcza kobiet, młodzieży, osób starszych, pracowników niskowykwalifikowanych i legalnych imigrantów,
3. zapewnienie lepszego poziomu wykształcenia – zwłaszcza:

- sprowadzenie **odsetka młodych ludzi przedwcześnie porzucających naukę do poziomu poniżej 10 proc.,**
- dążenie do tego, by co najmniej 40 **proc. osób w wieku 30–34 lat miało wykształcenie wyższe** (lub równoważne).

Wniosek z artykułu K. Lityńskiego (Tom 1, str. 67):

Polityka zwiększania innowacyjności, która decyduje o konkurencyjności całej gospodarki, nie może podlegać nieskoordynowanym, a często wykluczającym się inicjatywom poszczególnych ministerstw.

Polityka proinnowacyjna nie polega jedynie na szybkim wydatkowaniu wszystkich dostępnych środków unijnych pod hasłem „innowacja", lecz także na wytyczaniu i monitorowaniu kierunków i problemów, które powinny być rozwiązane w skali kraju i poszczególnych regionów.

Idea utworzenia platformy koordynującej działania proinnowacyjne rządu i jego agend nie jest nowa, jako koncepcja Krajowego Systemu Innowacji wydaje się obecnie ze wszech miar na czasie.

ISBN 83-894-7542-1
EAN 9788389475428

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