

SME INNOVATION IN POLAND – – POLICY AND INSTITUTIONAL ENVIRONMENT

PME NA POLÓŃIA – POLÍTICA E MEIO AMBIENTE INSTITUCIONAL

ABSTRACT Innovation of Polish economy as assessed by international institutions (OECD, EU) is below the average for EU-27 although one must note the progress from the group of catching up countries to that of moderate innovators (2010). Summary Innovation Index (SII) for Poland is lower than the average for all the EU member states but its growth rate is higher than the EU average. Monitoring of innovation indexes for Polish economy does not give a clear-cut picture of the progress made as changes follow different directions. Dynamics of innovation outlays is one among positive symptoms. Businesses operating in Poland allocate more and more resources for innovation. Small and medium-sized enterprises (SME) constitute the core of Polish economy. They represent 99.8% of all economic operators, employ 70.1% of the working population, generate 47.7% of the GDP and become increasingly active in innovation. When it comes to the latter one of its key conditioning factors are innovation policy pursued by the state and institutional environment. That environment consists of the network of training and advisory centres, technology transfer centres, incubators, technological parks and financial instruments that support enterprise and innovation. The main objective of the paper is to study the institutional environment and state policy as fundamental factors that impact the increase in SME innovation in Poland.

RESUMO A inovação da economia na Polónia, avaliada por instituições internacionais (OECD, EU) está abaixo da média para EU-27 embora se deva observar o progresso a partir do grupo de recuperação países para que de inovadores moderados (2010). O Índice Sumário de Inovação para a Polónia é mais baixo que a média para todos os estados membros da União Europeia mas a sua taxa de crescimento é superior à média da UE. A monitorização dos índices de inovação para a economia polaca não fornece uma imagem clara dos progressos realizados, uma vez que as mudanças seguem em direções diferentes. A Dinâmica de gastos de inovação é um entre os sintomas positivos. As empresas que operam na Polónia alocam cada vez mais e mais recursos para a inovação. As Pequenas e Médias Empresas (PME's) constituem o core Business da economia Polaca. Representam cerca de 99,8% de todos os operadores económicos, empregam 70,1% da população trabalhadora, geram 47,7% do PIB e tornam-se cada vez mais activas na inovação. Um dos seus principais factores condicionantes é a política de inovação seguida pelo Estado e o ambiente institucional. Este ambiente consiste numa rede de formadores e de consultores, centros de transferência de tecnologia, incubadoras, parques tecnológicos e instrumentos financeiros, que suportam a inovação. O principal objectivo deste artigo é estudar o ambiente institucional e a política do estado como factores fundamentais que influenciam o aumento da inovação na polónia.

KEY WORDS

SMEs, Innovation Policy,
Innovation Environment

PALAVRAS-CHAVE

SMEs, Política de Inovação,
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1. SME SECTOR INNOVATION IN POLAND

Small and medium-sized enterprises (SME) constitute the core of Polish economy. They account for 99.8% of all economic operators, employ 70.1% of the working population, generate 47.7% of the GDP¹. In 2008 Polish SME sector accounted for 1.862K businesses out of which 96% were micro-businesses.

When considering SME innovation in Poland and its changes it seems justified to point to a rather inhomogeneous picture created by both positive and negative changes recorded in the overall innovation of the Polish economy. Positive ones are mainly the dynamics of increase in innovation outlays (25.7% increase in 2008 to PLN 25.4 bn in nominal terms compared against the preceding year). Increase was also recorded for medium-sized and big companies involved in innovation understood as increasing innovation expenditure (31.8% in 2008). The drop in the share of companies which collaborated with other businesses or organisations in the field of innovation is a matter of concern (in 2008 their share was 19.6%) similarly to the drop in the total share of high- and medium-high tech to the level of 31.1% in 2008 with simultaneous increase of the share of medium-low and low-tech products².

Also international comparative rankings (OECD, European Union) confirm low innovation of Polish economy although they also indicate some symptoms of improvement. One of the most important comparative studies for innovation is the European/Union Innovation Scoreboard – EIS/UIS³.

According to the IUS Report of 2011 Poland still remains in the group of moderate innovators. In the group Poland ranked last but one after Czech Republic, Portugal, Norway, Spain, Greece, Italy, Malta, Slovakia, and Hungary but before Lithuania. Results of the study show that Summary Innovation Index (SII) for Poland is lower than the average for the European Union member states but despite the above its growth rate is higher for Poland than the EU average⁴.

Comparative analyses of EIS 2009 show that Poland is one among moderate innovators but its performance is below the average. Its relative strengths are based on Human resources and Outputs while relative weaknesses relate to the attractiveness of research systems, linkages & entrepreneurship, intellectual assets and outputs. High growth is recorded for PCT patent applications, societal challenges, community designs, license, and patent revenues from abroad. Unfortunately, a relatively strong decline is noted in SMEs innovating in-house and innovative SMEs collaborating with others⁵ (see Table 1).

Low innovation of Polish economy and its businesses is also confirmed by the latest Innovation Union Scoreboard 2010 of February 2011. Also according to its main findings Poland still remains in the group of countries which are moderate innovators and moderate growers and its innovation performance is below that of the EU – 27 (see Table 2).

¹ D. Klonowski, *Innowacyjność sektora MSP w Polsce. Rządowe programy wsparcia a luka finansowa* (SME innovation in Poland. Government assistance programmes and financial gap), Ernst & Young Sprawne Państwo, Warsaw 2009

² op. cit.

³ Based on the previous European Innovation Scoreboard, the new tool is meant to help monitor the implementation of the *Europe 2020 Innovation Union flagship Initiative* Innovation Union (COM(2010) 546 final) by providing a comparative assessment of the innovation performance of the EU27 Member States and the relative strengths and weaknesses of their research and innovation systems

⁴ *Polska 2010. Raport o stanie gospodarki 2010, (Poland 2010. Economic report 2010)* Ministry of Economy, Warsaw 2010

⁵ *Innovation Union Scoreboard 2010. The Innovation Union's performance scoreboard for Research and Innovation*, Inno Metrics, 1 February 2011

TABLE 1. COMPARISON OF SELECTED INNOVATION INDEXES FOR POLAND AND EU BASED ON THE EIS 2009 STUDY

FIRM ACTIVITIES AND OUTPUTS

	INDEX FOR POLAND	INDEX FOR EU-27
FIRM INVESTMENTS		
2.1.1 Business R&D expenditures as % of GDP (%)	0.19	1.19
2.1.2 Wydatki na technologie informacyjne (% GDP)	2.6	2.7
2.1.3 Non-R&D innovation expenditures as % of turnover (%)	1.03	1.03
LINKAGES & ENTREPRENEURSHIP		
2.2.1 SMEs innovating in-house as % of SMEs (share)	17.2	30.0
2.2.2 Innovative SMEs collaborating with others as % of SMEs (share)	9.3	9.5
2.2.3 Firm renewal rate (SMEs entries and exits as a % of all SMEs)	-	4.9
2.2.4 Public-private co-publications per million population	1.6	36.1
THROUGHPUTS		
2.3.1 EPO patent applications per million population	3.4	114.9
2.3.2 New Community trademarks per million population	41.9	124.5
2.3.3 New Community design per million population	49.8	121.2
2.3.4 Technology Balance of Payments flows as % GDP	0.35	1.00
INNOVATORS		
3.1.1 SMEs introducing product or process innovations as % of SMEs	20.4	33.7
3.1.2 SMEs introducing marketing or organisational innovations as % of SMEs	29.1	40.0

Source: Pro Inno Europe, Inno-Metrics, European Innovation Scoreboard 2009.
 Comparative analysis of innovation performance, January 2010, after: Polska 2010.
 Raport o stanie gospodarki 2010, Ministry of Economy, Warsaw 2010

TABLE 2. INNOVATION GROWTH LEADERS

GROUP	GROWTH RATE (%)	GROWTH LEADERS	MODERATE GROWERS	SLOW GROWERS
Innovation leaders	1.6	Finland (FI), Germany (DE)		Denmark (DK), Sweden (SE)
Innovation followers	2.6	Estonia (EE), Slovenia (SI)	Austria (AT), Belgium (BE), France (FR), Ireland (IE), Luxembourg (LU), Netherlands (NL)	Cyprus (CY), United Kingdom (UK)
Moderate innovators	3.5	Malta (MT), Portugal (PT)	Czech Republic (CZ), Greece (GR), Hungary (HU), Italy (IT), Poland (PL), Slovakia (SK), Spain (ES)	
Modest innovators	3.3	Bulgaria (BG), Romania (RO)	Latvia (LV)	Lithuania (LT)

Source: Innovation Union Scoreboard 2010.
 The Innovation Union's performance scoreboard for Research and Innovation, 2011, p. 11

The average growth rates for the four above groups show a convergence between country groups as the Innovation followers grow at a faster rate than the Innovation leaders and the Moderate innovators grow faster than the Innovation followers. Modest innovators, however, recorded a slower growth rate than Moderate innovators, mainly due to the poor growth performance of Lithuania. Less innovative countries have a tendency to grow faster than more innovative ones and the difference in innovation performance is decreasing. The average annual growth rate of the EU-27 is 0.85% over a five year period.

2. INSTITUTIONAL ENVIRONMENT OF POLISH BUSINESSES

Institutional environment is one of the key conditioning factors for business innovation. It consists of the network of training and advisory centres, technology transfer centres, incubators, technological parks and financial instruments which support enterprise and innovation. By their activities these organisations: (1) reinforce market structures by introducing new technology companies, (2) disseminate industrialisation by incubating new businesses based on local *know-how*, (3) develop high-

tech production systems and innovation incubation systems in urban areas of accumulated scientific potential⁶. Innovation and enterprise support centres assist technological progress by:

- disseminating knowledge and skills by training and advisory services,
- transferring and marketing new technologies,
- offering financial assistance (borrowing schemes, loan guarantees, e.g. *seed capital*, *start up*),
- offering advisory, technical support and facilities in business incubators,
- creating business clusters in technological parks, business zones and industrial parks⁷.

The report by the Polish Business and Innovation Centres Association in Poland (PBCIA) in 2008 in Poland there were 710 business and innovation centres (BIC), mainly training, advisory and information centres (318), technology transfer centres (87), local and regional borrowing schemes (82), business incubators (97 including 51 university pre-incubators)⁸.

Recent years witnessed dynamic increase in the number of BIC, in particular those involved in training and advisory services which account for almost 45% of all active centres. The latest initiatives in this area are the creation of big two networks in 2008: (1) the network of Regional European Social Fund Centres (RESFC) supposed to support local development by developing social resources, and (2) Enterprise Europe Network established under the Competitiveness and Innovation Framework Programme (CIP) offering services to strengthen the potential and innovation capacity of SMEs. Despite an intense, although mainly quantitative, development of innovation and business support organisations Poland has not closed the structural gap that divides it from the European Union and other highly developed countries. The reason is the lack of institutions

⁶ K.B. Matusiak, *Zasoby i kierunki rozwoju infrastruktury przedsiębiorczości i transferu technologii* (Resources and development lines of enterprise and technology transfer), [in:] K.B. Matusiak, E. Stawasz, A. Jęwtuchowicz, *Zewnętrzne determinanty rozwoju innowacyjnych firm* (External determinants of innovation companies development), Chair of Economics of the University of Lodz, Lodz, 2001.

⁷ *Polska 2010. Raport o stanie gospodarki 2010* (Poland 2010. Economic report 2010), Ministry of Economy, Warsaw 2010.

⁸ K.B. Matusiak, *Stan polskich ośrodków innowacji i przedsiębiorczości w 2009 r.* (Polish innovation and business centres in 2009), [in:] K.B. Matusiak (ed.), *Ośrodki Innowacji i Przedsiębiorczości w Polsce, Raport 2009* (Polish innovation and business centres. Report 2009), Polish Business and Innovation Centres Association, Lodz/Warsaw 2009.

that could offer support to businesses delivering innovation projects between the research and implementation phase⁹.

The role of technological parks and incubators is crucial for support to innovation. In 2009 in Poland there were 46 initiatives undertaken at various stages of organisational advancement. Studies showed that an average technological park cooperates with 26 institutions among which scientific centres (7) and local authorities (6) play a special role. In mid-2009 existing technological parks hosted 583 business operators which generated over 17K jobs. Among factors encouraging businesses to base themselves in technological parks we can list: the rent (58% answers by companies included in the study), good location (46%), services offered by the park (33%) and the possibility to establish cooperation links with other businesses in the park (21%)¹⁰.

In mid-2009 there were 17 technological incubators in Poland (over a half of them formed part of technological parks) whose potential was practically fully exploited. Incubators are usually based in agglomerations where more than one candidate applies for each place made available. In 2009 all incubators hosted in total 350 businesses employing ca. 2K people. In most incubators a business can spend maximum 3 years although in some of them no time-limits apply¹¹.

For innovation centres especially for regional ones partnership and networking with public administration and other operators are very important. High quality of these links strongly impacts innovation capacity of businesses and contributes to location attractiveness for new companies. Innovation centres are intermediaries in the access of companies to external knowledge resources, to the assessment of their technological needs and capabilities and get them involved in transfer and adaptation of external solutions.

However, creating an effective system of knowledge transfer and marketing of technology faces numerous barriers. They can be structural barriers (gaps in economic policy and strategies, R&D development, poor development of regional growth poles), systemic barriers (excessive and outdated legal system), awareness and culture barriers (lack of trust and promotion of positive innovation examples with relatively low mobility of media and decision makers), and competence barriers (low competence of local authorities and R&D managing bodies)¹².

3. INNOVATION POLICY IN POLAND

Poland, similarly to some other EU member states, is a country where innovation policy is aimed at "catching up" with other countries. However, the share of R&D expenditure in gross domestic product is still too low even when we compare ourselves against countries where the rate is the lowest. Thus our country should focus on the improvement of the efficiency of institutional infrastructure by applying adequate instruments of innovation policy (mainly financial and organisational) rather than on the expansion of the infrastructure itself.

Currently the key government document which identifies the objectives and directions of innovation policy of

⁹ Polska 2010. *Raport o stanie gospodarki 2010* (Poland 2010. *Economic report 2010*), Ministry of Economy, Warsaw 2010

¹⁰ *Benchmarking parków technologicznych w Polsce – wyniki badania* (Benchmarking of technological parks in Poland – results of the study), Ecorys Polska Sp. z o.o. study commissioned by Polish Agency for Enterprise Development. Results based on 105 interviews with companies.

¹¹ Polska 2010. *Raport o stanie gospodarki 2010* (Poland 2010. *Economic report 2010*), Ministry of Economy, Warsaw 2010

¹² *System transferu technologii i komercjalizacji wiedzy w Polsce – Siły motoryczne i bariery*, K. B. Matusiak, J. Guliński (ed.), Polish Agency for Enterprise Development, Warsaw, May 2010

the state is the programme *Strategy for increasing the innovativeness of the economy for 2007-2013*¹³, the continuation of the government programme *Improving innovation in the Polish economy till 2006. Strategy for increasing the innovativeness of the economy for 2007-2013* is a document which assesses the innovation of the Polish economy and recommends activities which when implemented may facilitate the creation of the knowledge-based economy in Poland where the strength of businesses will be based on innovation. *Strategy for increasing the innovativeness of the economy for 2007-2013* also continues other actions initiated by the Government and complements them by suggesting further activities up to 2013. In accordance with the assessment of real innovation in Polish economy included in the document: "(...)the trends for growth in the highly-developed countries make it clear that the building of competitive advantage on the basis of knowledge and innovation is the only way to guarantee development in both the short and long terms. Hence a need to focus on building a global knowledge based economy (KE)".

The Government assesses that the correct strategy for Poland to arrive at a knowledge-based economy consists in simultaneous implementation of three development paths:

- increasing employment in traditional sectors and businesses which use new technologies,
- starting up new companies and developing SMEs, in particular in high-tech sectors which have appropriate knowledge and are aware of the need to use new technologies and knowledge management methods but do not have resources for innovation,
- directing and motivating big companies to create and implement outcomes of research works¹⁴.

Strategic goal of the *Strategy for increasing the innovativeness of the economy for 2007-2013* is defined as a growth of the innovativeness of enterprises in order to maintain the fast development of the economy and to create new, better jobs. The goal based on the growth in innovation, research and development, knowledge and education perfectly fits the assumptions of Lisbon Strategy reviewed and updated in 2005.

Activities proposed by the *Strategy for increasing the innovativeness of the economy for 2007-2013* focus on businesses where innovation originates and is implemented, thus the essence of the Government strategy can be boiled down to "mutual emergence in innovation processes"¹⁵.

The first stage in the sequence of actions is to develop human resources capable of creating knowledge-based economy. The second stage consists in developing research for the needs of the economy. Then it is proposed to deal with the protection of intellectual property rights. Further step is connected with attracting the funds necessary to deliver planned activities. This is a priority area as business people declare that the lack of funds is the main obstacle to implementing innovations and is decisive for low innovation of Polish economy. In mutual emergence of directions of increased innovation of the economy special role is played by innovation infrastructure which both provides the basis and the environment for other operations. Innovation infrastructure includes training, advisory services, access to new IT technologies, facilitated cooperation with R&D and facilitated transfer of new technologies and organisational solutions.

One of the main tools of implementing innovation policy in Poland is the *Operational Programme Innovative Economy 2007-2013 (OP IE)*¹⁶. The programme is one of the elements of the system which serves efficient use of structural funds allocated to Poland for the fi-

¹³ Kierunki zwiększania innowacyjności gospodarki na lata 2007-2013 (*Strategy for increasing the innovativeness of the economy for 2007-2013*), Ministry of Economy, Department of Economic Development, Warsaw, 19 August 2006

¹⁴ based on *Proposed directions of science and technology development in Poland till 2020*, Ministry of Science and Computerisation, Warsaw, November 2004.

¹⁵ Kierunki zwiększania..., p. 39

¹⁶ *Operational Programme Innovative Economy 2007-2013. National Strategic Reference Framework*, Warsaw, 1 October 2007

nancing period 2007-2013. OP IE in its assumptions complies with the objectives of the updated Lisbon Strategy¹⁷ the main objective of which is economic growth and employment with the maintenance of full compatibility with the objectives of sustainable development. The main objective of the *Operational Programme Innovative Economy 2007-2013* is the "Growth of Polish economy based on innovative companies". The main objective is to be achieved by delivering six main goals with business innovation being the first priority¹⁸.

Total amount of public funds involved in the OP IE in 2007-2013 amounts to ca. EUR 9, 711.6 m and represents the highest financial outlays for innovation policy in Poland.

The document was approved by research and business community who stresses well diagnosed condition of Polish innovation and correct listing of its basic problems as the main strengths of OP IE. Well stated objectives and priorities are also positive. Rightly the importance of science in increasing innovation was noted together with the importance of internationalisation of the economy for improving competitiveness of businesses. All OP IE priorities: research and development of new technologies, R&D infrastructure, funds for innovation, investment in innovative undertakings, innovation dissemination, Polish economy in international market, ICT technologies in administration for businesses, and technical assistance are designed to support innovation. There are also weaknesses in the Programme, such as its insufficient rooting in the theory of economics and not using the best practices of other countries in innovation policy.

Opportunities offered by the OP IE in increasing the innovation of Polish economy are linked to its seven-year perspective which makes the Programme independent from frequent political changes in Poland as the mem-

bership in the EU obliges us to stick to its assumptions. The Programme and its implementation offer potential benefits to companies, administration, researchers, and the society by contributing to competitive economic growth.

In the opinion of experts from the Institute of Knowledge and Innovation opportunities for creating innovation economy in Poland are accompanied by threats. Innovation policy delivered in line with the OP IE at least partly will play the redistributive role and it will support phasing-out and low productivity sectors of knowledge at the cost of supporting priority and best developed ones. On top of that, the success of the Programme depends upon political will connected with innovation policy, being aware of the role and importance of innovation for economic growth considering social and economic conditions of Poland and structural reforms. EU funds by themselves without structural reforms will not bring about expected results.¹⁹

4. CONCLUSIONS

It seems that in terms of concept the currently implemented innovation policy meets the requirements of modern challenges and its activities, such as the development of technological and scientific base, promoting innovative solutions and strengthening cooperation between science and business are the most important challenges facing Poland. In order, however, to discuss a real and effective innovation policy, the Government

¹⁷ *An Agenda of economic and social renewal for Europe*, COM (2000) 7, Bruksela, 28 lutego 2000

¹⁸ *Operational Programme Innovative Economy 2007-2013. National Strategic Reference Framework*, Warsaw, 1 October 2007, p. 61

¹⁹ *Polska bardziej innowacyjna?*, Opinion no. 1, Institute of Knowledge and Innovation, Warsaw, 18 July 2006, <http://www.instytut.info/Publikacje/Opinie-i-rekomendacje/opinia-1-program-operacyjny-innowacyjna-gospodarka-media.html> [access on 2 February 2009]

must make a huge effort and intensify the involvement of entities in the National System of Innovation to deliver tasks that can improve innovation of Polish economy and to stir systemic evolution in Poland. The initiative to establish the Innovation Board is one of the most urgent and necessary steps in this direction. Setting up of the Board will be a political decision which will legitimize the statements on the priority the Government gives to innovation vis-à-vis the society and the European Commission.

Some issues remain unresolved, such as improper adaptation of the tax system (tax allowances) and loan policy to the needs of innovation economy or the absence of financial facilities (in particular *venture capital*). Appropriate financial motivation of innovators engaged in scientific, technological and organisational progress should also play its role.

It is also worth treating seriously expert indications pointing to threats to the objectives of the innovation policy of the state. That is particularly true of the need to undertake structural reforms in the Polish system of innovations which should be consistently implemented by decision makers independently of the changes on political scene. The task should become a priority as by the membership in the European Union we have been given a historic opportunity to catch up when it comes to economic development and the standard of living.

LITERATURE

1. *An Agenda of economic and social renewal for Europe*, COM (2000) 7, Brussels, 28 February 2000
2. *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – Innovation policy: updating the Union's approach in the context of the Lisbon strategy*, COM/2003/0112 final
3. *Communication from the Commission Europe – 2020. A strategy for smart, sustainable and inclusive growth*, Brussels, 3.3.2010, COM(2010) 2020
4. *Green Paper Entrepreneurship in Europe*, COM(2003) 27 final
5. Grodzka, D., Zygierewicz, A., *Innowacyjność polskiej gospodarki (Innovation in Polish economy)*, Infos, Office of Parliamentary Studies, No. 6(30), 27 March 2008
6. Jałowiecki, B., *Nowe przestrzenie produkcji jako czynnik rozwoju regionalnego i lokalnego* in A. Kukliński, B. Jałowiecki, (ed.), *Restrukturyzacja regionów jako problem współpracy europejskiej* t.1, European Institute of Regional and Local Development, Warsaw, 1991
7. Jasiński, A. H., *Innowacje i polityka innowacyjna*, Publishing House of the University in Białystok, Białystok 1997
8. Jasiński, A.H., *Drugi przełamywania impasu, "Sprawy Nauki"*, 1997 No. 2
9. *Kierunki działań rządu wobec małych i średnich przedsiębiorstw do 2002 roku*, Ministry of Economy, Department of Craft and SMEs, 1999
10. *Kierunki zwiększania innowacyjności gospodarki na lata 2007-2013 (Strategy for increasing the innovativeness of the economy for 2007-2013)*, Ministry of Economy, Department of Economic Development, Warsaw, 19 August 2006
11. *Communication for the Spring Summit of the European Council Working together for economic growth and employment, A new start for the Lisbon Strategy*, Brussels, 2 February 2005 COM (2005) 24
12. *Koncepcja średniookresowego rozwoju gospodarczego kraju do roku 2002.*, Ministry of Economy, Warsaw 1999
13. *Krajowy Program Reform na lata 2005-08*, Ministry of Economy, Warsaw, 2005
14. Lundvall, B.- A. (ed), *National System of Innovation. Towards a Theory of Innovation and Interactive Learning*, London 1992
15. Matusiak, K. B., Guliński, J., (ed) *System transferu technologii i komercjalizacji wiedzy w Polsce – Siły motoryczne i bariery*, Polish Agency for Enterprise Development, Warsaw, May 2010
16. Matusiak, K. B., Stawasz, E., *Otoczenie instytucjonalne małych firm innowacyjnych*, [in:] K.B. Matusiak, E. Stawasz, A. Jewtuchowicz (ed.), *Zewnętrzne determinanty rozwoju innowacyjnych firm*, Publishing House of the University of Lodz, Lodz, 2001
17. *National Strategic Reference Framework supporting economic growth and employment*. National Cohesion Strategy, Ministry of Regional Development, Warsaw, May 2007 r.
18. *National Development Plan 2004-2006*, adopted by the Council of Ministers on 14 January 2003
19. Okoń-Horodyńska, E., *Narodowy system innowacji w Polsce*, Karol Adamiecki School of Economics, Prace Naukowe, Katowice, 1998,
20. *Oslo Manual*, OECD/Eurostat 2005
21. *Pierwszy plan działań na rzecz innowacji w Europie (First Action Plan for Innovation in Europe)*, COM(96) 589 final

22. *Policy Mix for Innovation in Poland – Key Issues And Policy Recommendations*, Working Party on Innovation and Technology Policy, DSTI/STP/TIP(2006)13/FINAL, June 2007, Warsaw
23. *Polityka innowacyjna w Polsce do 2006 roku, jako jeden z czynników poprawy konkurencyjności gospodarki*, Ministry of Economy, Archives 2005, accessed on-line [downloaded on: 28.01.2009]
<http://www.mg.gov.pl/Wiadomosci/Archiwum/Rok+2005/Polityka+innowacyjna+w+Polsce+do+2006+roku.htm>
24. *Polska bardziej innowacyjna?*, Opinia nr 1, Instytut Wiedzy i Innowacji, Warsaw, 18 July 2006, <http://www.instytut.info/Publikacje/Opinie-i-rekomendacje/opinia-1-program-operacyjny-innowacyjna-gospodarka-media.html> [downloaded on: 2 February 2009]
25. Pro Inno Europe, Inno-Metrics, European Innovation Scoreboard 2009. Comparative analysis of innovation performance, January 2010,
26. Polska 2010. Raport o stanie gospodarki 2010 (*Poland 2010. Economic report 2010*), Ministry of Economy, Warsaw 2010
27. *Operational Programme Innovative Economy 2007 - 2013. National Strategic Reference Framework*, Warsaw, 1 October 2007
28. *Operational Programme Innovative Economy 2007 - 2013. National Strategic Reference Framework*, Warsaw, 1 October 2007, p. 61
29. *Program wspierania rozwoju instytucji regionalnych działających na rzecz transferu technologii*, Ministry of Economy, Warsaw 1997
30. *Proponowane kierunki rozwoju nauki i technologii w Polsce do roku 2020*, Ministry of Science and Computerisation, Warsaw, November 2004.
31. Rothwell, R., Zegveld, W., *Reindustrialization and Technology*, Longman, London, 1985
32. Sroka, J., Kwieciński, L., *Ocena wdrażania DSI. Regionalny System Innowacyjny versus Narodowy System Innowacyjny*, Dolnośląskie Centrum Studiów Regionalnych, Wrocław, 2007
33. Stawasz, E., *Przegląd podstawowych pojęć: innowacje, transfer technologii, krajowy i regionalny system innowacji, polityka innowacyjna*, in T. Markowski, E. Stawasz, R. Zembaczyński (ed.), *Instrumenty transferu technologii i pobudzania innowacji. Wybór ekspertów*, Przedświt Publishing House, Warsaw, 1997
34. *Strategia Informatyzacji Rzeczypospolitej Polskiej - e-Polska 2004-2006*, Ministry of Science and Computerisation, Warsaw, December 2003
35. *Strategia Rozwoju Kraju na lata 2007-15*, document adopted by the Council of Ministers on 29 November 2006, updated on 30 December 2008 (RM)
36. *Strategia rozwoju nauki w Polsce do 2013 r. oraz perspektywiczna prognoza rozwoju do roku 2020*, Ministry of Science and Computerisation, document adopted by the Council of Ministers on 29 June 2005
37. *Strategia zwiększania nakładów na działalność B+R w celu osiągnięcia założeń Strategii Lizbońskiej*, Document drafted in co-operation with the Department of Innovation of the Ministry of Economy, Labour and Social Policy, Warsaw, March 2004
38. *Technology&Economy. The Key Relationships*, OECD, Paris 1992
39. *Ustawa o Narodowym Centrum Badań i Rozwoju*. Draft of 02.12.2008, Ministry of Science and Computerisation
40. Act of 29 July 2005 on some forms of support to innovation, Dz. U. No. 179 item 1484
41. *Act of 2008 on research institutes*. Draft of 02.12.2008, Ministry of Science and Computerisation
42. *Więcej badań naukowych i innowacji: Inwestycje na rzecz wzrostu i zatrudnienie: wspólne podejście COM(2005)*
43. *Proposal Council decision on guidelines for employment policy in EU Member States COM/2006/0815 final – CNS 2006/0271*
44. *Założenia polityki innowacyjnej państwa do 2002 roku*, Committee of Scientific Research, Warsaw, October 1999
45. *Zwiększanie innowacyjności gospodarki w Polsce do 2006 roku*, Ministry of Economy, Warsaw, July 2000