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## **On the Need to Continue Diagnosing Low Innovation Performance of the Polish Economy\***

***Abstract.** The aim of the article is to analyse one of the most well-known reports on the innovation performance of the Polish economy conducted by M. Kleiber. The research tool used in this paper was presented definition of innovation by the author and described innovation models. Selected macro and microeconomic indicators were used to assess the economy innovation performance. During the period of the fourth financial framework (2007-2013 – Barroso's package) the gap between the innovation performance of the Polish economy and economies of other EU countries increased. Kleiber's report "Wise Poland" provides an exhaustive description of weaknesses of the state, of the system of research and education and the low level of relations with the international economy. The state was de facto absent from areas recognized as crucial in fostering innovative economy. Doubts raised by this diagnosis do not concern the description of the low innovativeness of the economy, but the lack of sufficient explanations of its causes. For this reason and given a failure to address relevant research problems resulting from the presented definition of innovation as well as that the lack of transition from the stage of diagnosis to the implementation phase was not explained, there is the need to continue diagnosing the low innovation performance of the Polish economy.*

***Keywords:** definition of innovation, innovation models, target costing, financial success, invention*

### **Introduction**

Given the fact of the almost depletion of simple sources of economic growth, Poland's ability to achieve sufficiently high GDP growth rates in order to reduce

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\* The paper translated by Grzegorz Grygiel.

unemployment and equalizing the level of development compared to the “old” EU member states (EU-15) is crucially dependent on the innovation performance of the economy. A higher rate of economic growth is also essential for halting the growing public debt, or at least keeping its growth below that of the GDP, which is the prerequisite for the stability of public finance.

New possibilities of financing innovation, connected with the financial framework 2007-2013, including, among others, the Innovative Economy Operational Programme (IE OP), have raised the question whether the Polish economy is innovative enough to absorb the funds available under IE OP, which amount to approximately 40 billion PLN and whether the funds will be used effectively. A synthetic answer to this question will be given on the basis of selected macro and micro-economic indicators of innovativeness.

A complete diagnosis of the low innovation performance of the Polish economy should include four knowledge elements. Firstly, it is necessary to describe the actual situation, i.e. the facts (*know-what*). Secondly, an explanation must be provided, i.e. an answer to the question why things are the way they are, which identifies causes or intentions and goals (*know-why*). Thirdly, one needs to present normative knowledge about how things should be and what should be done to achieve the desired state of things (*know-how*). Fourthly, it is necessary to specify who or what institution responsible for a given sphere of life should do it (*know-who*) [Bernaert & Poels 2011]. An analysis of a particular diagnosis should indicate what type of knowledge has been presented in it.

The preparation of a diagnosis is also closely connected with knowledge management. The presented understanding of knowledge management is based on the process-based approach [Davenport & Prusak 1998]. According to this approach, there are three main process of knowledge management:

- the process of knowledge creation,
- the process of knowledge dissemination,
- the process of knowledge using.

The process of knowledge creation involves the creation of the four kinds of knowledge mentioned earlier. The process of disseminating knowledge contained in a given innovation report depends, on the one hand, on the willingness and possibilities of the authors, and on the other hand, on the attitude and support of the state and the media. The process of knowledge using should consist in moving from the diagnosis stage to implementation. From a practical point of view, it is a crucial problem, for if, despite its urgency, such a transition does not occur, it becomes necessary to present additional diagnosis to answer the question why such a transition from the diagnosis to implementation has not taken place.

The purpose of the article is a critical analysis of one of the most well-known reports on the innovation performance of the Polish economy and the statement on this basis of whether there is still a need to diagnose low level of innovative-

ness of the Polish economy. Undertaking of this second problem results from the J. Hausner's idea [Hausner 2012], that it is time to move from diagnosis to implementation. Without absolutely denying the need for such a transition, the question arises whether it is accurate idea contained in this statement, that economy innovativeness is already sufficiently diagnosed.. For purposes of this specific analysis, which focuses on the *know-what* knowledge, the author has selected the report prepared by M. Kleiber [2011]. Its choice was dictated by the fact that this is so far the most comprehensive and versatile of the important reports that have arisen during the fourth financial perspective (2007-2013). Probably for this reason, Kleiber gave it a subtitle: *A Decalogue for a society of knowledge, skills and entrepreneurship*. The *know-why* knowledge it contains is also very valuable. Including all these reasons this report suited to examine whether there is further need for the diagnosis of low innovativeness of the Polish economy.

A useful research tool used in the analysis of Kleiber's report will be correct definition of innovation. With this definition and in particular with the clarification of the term "financial success of the company" by means of Target Costing will result conclusions regarding the most important issues that should be taken in the diagnosis of low innovativeness of the Polish economy.

Another research tool used in the analysis will be models of innovation described in the literature. They will be used to determine to what extent Kleiber drew on the existing knowledge to prepare his diagnosis of innovation performance. This is expected to contribute to a better understanding of the diagnosis.

A preliminary assessment of the innovativeness of the Polish economy in the financial framework 2007-2013 as an introduction to the study report Kleiber will be made on the basis of selected macro- and micro-economic indicators.

Used in the title the term "low level of innovativeness" of the Polish economy results from the comparisons with other EU countries.

## **1. Preliminary assessment of innovation performance**

### **1.1. Selected macro-economic indicators**

Despite the use of funds under IE OP, the innovation performance of the Polish economy has not improved, and, compared to EU-15 countries, has even deteriorated. After the completion of IE OP, Poland has found itself in the group of the four least innovative countries, next to Latvia, Bulgaria and Romania [European Commission 2014, p. 92]. In Table 1 are given data on innovativeness of the Polish economy and the EU. The average annual rate of growth of innovation index in the years 2006-2013 was approximately 2 times less than the size of the EU. This led to a decline in the share of the Polish innovation index from 0.53 in 2006 to 0.5 in 2013 that is a decrease of 5.6%.

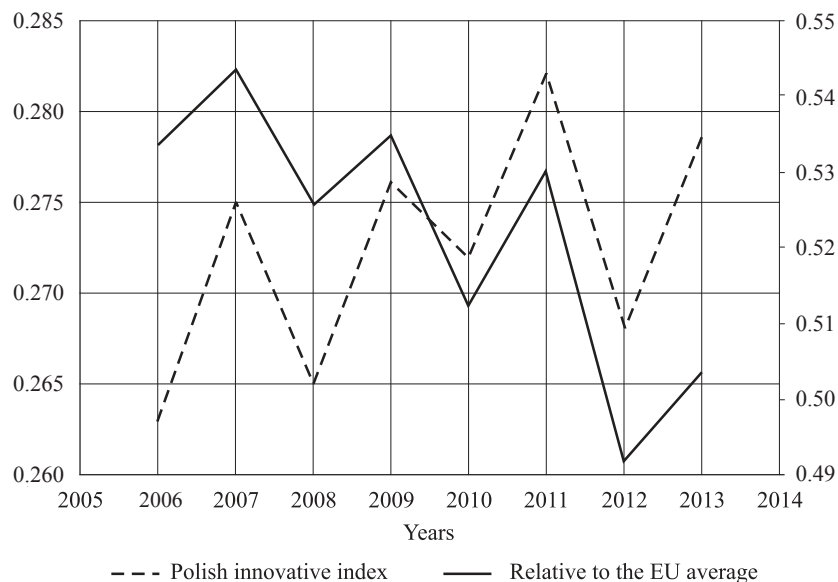
Table 1. Innovation index and its relation to the EU average for Poland in the years 2006-2013

Years	Poland	EU	Relative to the EU average
2006	0.263	0.493	0.533
2007	0.275	0.506	0.543
2008	0.265	0.504	0.526
2009	0.276	0.516	0.535
2010	0.272	0.531	0.512
2011	0.282	0.532	0.530
2012	0.268	0.545	0.492
2013	0.279	0.554	0.504
The average annual growth rate	0.76%	1.55%	—

Source: European Commission 2014, *Innovation Union Scoreboard 2014*, p. 92, <https://bookshop.europa.eu/en/innovation-union-scoreboard-2014-pbNBAY14001/?CatalogCategoryID=Gj0KABst5F4AAAEjsZAY4e5L> [access: 5.12.2016].

Chart 1 illustrates shaping innovation index and its relation to the EU average for Poland in the years 2006-2013.

Chart 1. The innovation index for Poland (left axis) and its relation to the EU average (right axis)



Source: European Commission 2014, *Innovation Union Scoreboard 2014*, p. 92, <https://bookshop.europa.eu/en/innovation-union-scoreboard-2014-pbNBAY14001/?CatalogCategoryID=Gj0KABst5F4AAAEjsZAY4e5L> [access: 5.12.2016].

According to the trend lines in Chart 1 innovation measured by the innovation index, which has been calculated on the basis of 25 indicators improved somewhat from the level exceeding 0.26 in 2006 to 0.28 in 2013. Innovation in relation to the EU average, unfortunately, has significantly deteriorated by about 5.6% during the same period. Rather than to catch up the distance to the EU, it has increased.

Table 2 presents data about innovation performance in the countries of Central and Eastern Europe in terms of the Global Innovation Index 2014.

Table 2. Ranking of countries in Central and Eastern Europe by innovation performance (July 2013)

Position	Country	Index	Relative to the Switzerland index
1	Switzerland	64.8	1.00
24	Estonia	51.5	0.84
26	The Czech Republic	50.2	0.82
28	Slovenia	47.2	0.81
34	Latvia	44.8	0.77
35	Hungary	44.6	0.76
37	Slovakia	41.9	0.75
39	Lithuania	41.0	0.73
42	Croatia	40.7	0.71
44	Bulgaria	40.7	0.70
45	Poland	40.6	0.69
55	Romania	38.1	0.62
58	Belarus	37.1	0.60
63	Ukraine	36.3	0.56

Source: *The Global Innovation Index 2014: The Human Factor in Innovation*, 2014, Fontainebleau – Ithaca – Geneva: Cornell University, INSEAD, and WIPO, pp. XXIV-XXV, [www.globalinnovationindex.org/userfiles/file/reportpdf/GII-2014-v5.pdf](http://www.globalinnovationindex.org/userfiles/file/reportpdf/GII-2014-v5.pdf) [access: 25.08.2014].

Poland is ranked 45th in the world and in the group of EU countries is only ahead of Romania. Macroeconomic indicators contained in Tables 1 and 2 point to the low efficiency in the use of funds for innovation. These data, taking into account the size of the innovation index in comparison with the EU in Table 1 and with other countries in Table 2 are the basis for the formulation of the conclusion that the Polish economy is characterized by a low level of innovativeness.

## 1.2. Selected micro-economic indicators

Selected indicators of innovation performance of companies, provided by the Central Statistical Office (GUS) for the period 2006-2013 (GUS) are shown in Table 3.

Table 3. Selected indicators of innovation performance of companies for 2006-2013 (in %)

Item	2006	2007	2008	2009	2010	2011	2012	2013	% change 2013/2006
Share of innovative companies in the total number of manufacturing companies	23.7	–	21.4	18.1	17.1	16.1	16.5	17.1	–27.8
Share of innovative companies in the total number of manufacturing companies – new or significantly improved products	16.1	–	15.6	12.7	12.1	11.2	11.2	11.0	–31.7
Share of innovative companies in the total number of manufacturing companies – new or significantly improved products to the market	7.8	–	9.4	7.0	6.8	6.1	5.6	5.7	–26.9
Share of innovative companies in the total number of companies in the services sector	21.2	–	16.1	14.0	12.8	11.6	12.4	12.8	–39.6
Share of innovative companies in the total number of companies in the services sector – new or significantly improved products	13.2	–	10.7	8.0	7.9	6.4	7.0	5.8	–56.1
Share of innovative companies in the total number of companies in the services sector – new or significantly improved products to the market	7.2	–	6.5	4.4	4.3	3.4	3.4	2.8	–61.1
Share of net revenues from the sale of innovative products in net revenues from total sales of manufacturing companies (from the industrial processing section)	13.5	–	12.4	10.6	11.3	8.9	11.5	10.7	–20.7
Share of manufacturing companies (employing 50 or more persons) which invested in innovation	37.3	31.8	16.9	29.6	29.6	29.8	28.8	29.6	–20.6
Share of manufacturing companies which cooperated in the area of innovation*	11.3	–	8.5	6.4	6.1	5.5	6.0	5.2	–54.0

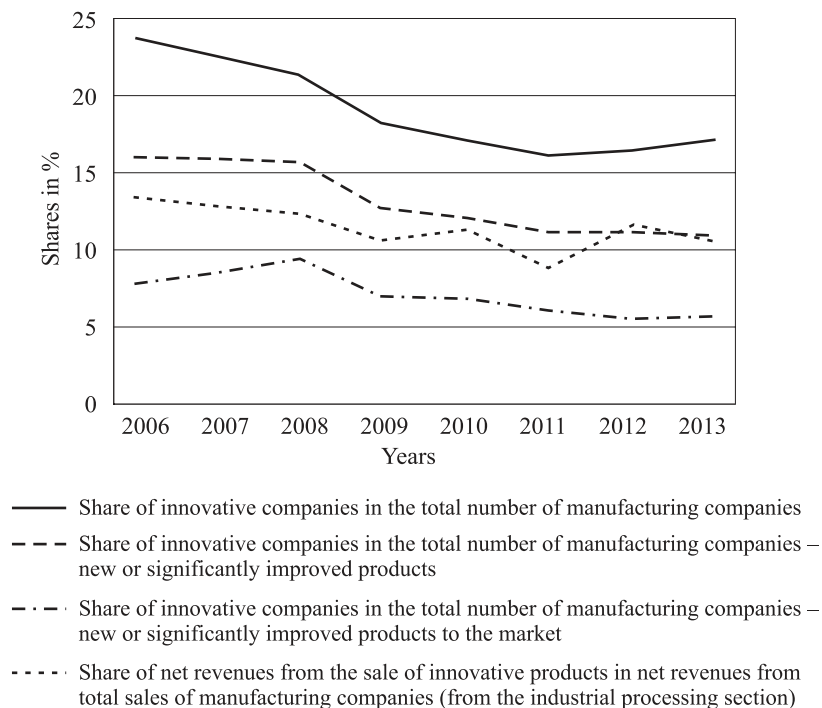
\* Cooperation in the area of innovation refers to a company's participation in joint projects together with other companies or non-commercial institutions (suppliers, customers, competitors, consultants, laboratories, private R&D institutions, Polish Academy of Sciences centres, research institutes, foreign public R&D, universities).

Source: GUS, the Statistical Office in Szczecin, 2015, *Działalność innowacyjna przedsiębiorstw w latach 2012-2014*, <http://stat.gov.pl/obszary-tematyczne/nauka-i-technika-spoleczenstwo-informacyjne/nauka-i-technika/dzialalnosc-innowacyjna-przedsiębiorstw-w-latach-2012-2014,2,13.html> [access: 20.04.2016].

Data presented in Table 3 suggest that access to European funds under IE OP not only did not improve innovation indicators, but actually contributed to their deterioration compared with 2006. All of the growth rate for this period have a negative sign. A particularly dramatic decrease can be observed in the services sector, which is the biggest sector in a typical market economy. Extremely harmful phenomenon is the 46.5% decrease in the proportion of industrial enterprises which cooperated in the field of innovation. Similarly, a decline in net revenues from the sale of innovative products is indicative of a low effectiveness of innovation performance, which is measured in terms of market success achieved by companies.

Chart 2 illustrates the falling trends in innovation indicators for manufacturing companies. There you can see, among others a fall in the share of innovative enterprises in the total number of industrial enterprises from 23.7% in 2006 to 17.1% in 2013, an decrease of 27.8%. There was a particularly worrying decline in the share of innovative companies (new products or significantly improved for the

Chart 2. Selected indicators of innovation performance of manufacturing companies



Source: GUS, the Statistical Office in w Szczecin, 2015, *Działalność innowacyjna przedsiębiorstw w latach 2012-2014*, <http://stat.gov.pl/obszary-tematyczne/nauka-i-technika-spoleczenstwo-informacyjne/nauka-i-technika/dzialalnosc-innowacyjna-przedsiębiorstw-w-latach-2012-2014,2,13.html> [access: 20.04.2016].

market) in the total number of manufacturing companies – from the already low level in 2006 of 7.8% to a mere 5.7% in 2013, which corresponds to a decrease of 26.9%, indicating that despite increasing investments in innovation, society is gaining diminishing returns in the form of consumer goods. Evolution of indicators of innovation performance of manufacturing companies, as shown in Chart 2 suggests that innovation funds have not been used effectively.

## **2. Research tools used to analyze Kleiber's report**

Low innovativeness of Polish economy was a subject of the scientific debate and reflection in academia for a long time. The result was, among other things publication, from 2011 onwards a number of reports, of whom three can be counted towards the most well-known [Kleiber 2011; Geodecki et al. 2012; Rybiński 2013]. The following analysis focuses on the report prepared by Kleiber.

### **2.1. Definition of innovation**

We will start our analysis of the Kleiber's report about the innovation performance of the Polish economy by reviewing definitions of innovation that can be found in the literature of the subject. This is important since the choice of a particular definition and one or more innovation models developed in the literature will prejudice the perception and analysis of innovation processes.

The well-known definition is provided in the Oslo Manual [Oslo Manual 2008, pp. 48-52]. Stated in it that the minimum requirement for an innovation is that the product, process, marketing method or organizational were new (or significantly improved) to the company. This is the definition in the sense of results incomplete, since that product is to be a novelty is a necessary condition, but not sufficient one for its recognition as innovation.

To provide a more adequate definition of innovation, let us quote the definition proposed by Mckeown which emphasizes the novelties usefulness [Mckeown 2008, p. 2]: "Innovation is new stuff that is made useful." Another definition of innovation from an organizational perspective proposed by R. Luecke and R. Katz [2003, p. 2], which can help us to formulate the definition adopted in this article: "Innovation [...] is generally understood as the successful implementation of a new thing or method [...]." The explanation of the meaning of "successful implementation" of a new thing or method can be found in Mckeown's general definition: it is its usefulness. Luecke and Katz used an imprecise term "successful implementation." It is therefore necessary to explain it by specifying what it involves and what criterion should be used to assess whether an implementation has been successful. Based on the definitions provided above, a new definition



has been formulated by the author of this paper: innovation in a company is an implemented invention, which may be a new or improved product, technological process, raw material, market niche, distribution channel, or an organisational change providing manufacturing, market and financial success.<sup>1</sup> This is the definition that combines the modified results and process approach.

Of course, this raises the question of how to exactly determine whether the criteria of manufacturing, market and financial success, mentioned in the definition of innovation have been met. In other words, the point is to present operational definition, which is the exact description of how to measure these successes of the company. The answer to this question will be represented by the target costing (TC) with its fundamental theorem. [Mielcarek 2013b, pp. 395-396; 2014a, p. 409].

If the real unit cost of a product  $k_r$ , after implementing an invention does not exceed the target cost [Mielcarek 2015, pp. 347-348; 2016, p. 295]:

$$k_r \leq k_d \quad (1)$$

where:

$$k_d = p_d - p_d ROS_{me} \quad (2)$$

$p_d$  – projected product price

and the real demand  $P_r$  is not lower than the projected demand

$$P_r \leq P_d \quad (3)$$

and the real market price is not lower than the projected price

$$p_r \leq p_d \quad (4)$$

then the real return on sales  $ROS_r$  is not lower than the minimum value

$$ROS_r \geq ROS_{me} \quad (5)$$

where [Mielcarek 2016: p. 294]:

$$ROS_{me} = \frac{I_0 + W_0 + \sum_{i=1}^n \frac{\Delta W_i + I_b - t(A_i + I_i)}{(1+r)^i} - \frac{Z}{(1+r)^n}}{\sum_{i=1}^n \frac{(1-t) S_i}{(1+r)^i}} \quad (6)$$

<sup>1</sup> This definition is an expansion of the definition of innovation used in the context of management accounting [Mielcarek 2014a, p. 213].

- $ROS_{me}$  – minimum return on sales  $EBITDA_m$ ,  
 $I_0$  – initial capital investment,  
 $W_0$  – initial working capital investment,  
 $S_i$  – sales revenue over period  $i$ ,  
 $\Delta W_i$  – change in working capital over period  $i$ ,  
 $I_{bi}$  – gross investment over period  $i$ ,  
 $A_i$  – depreciation over period  $i$ ,  
 $I_i$  – interest over period  $i$ ,  
 $Z$  – terminal-year cash flow at the end of the project's life,  
 $t$  – income tax rate,  
 $r$  – discount rate,

and the investment meets the acceptance criteria:

$$NPV_r \geq 0 \quad (7)$$

$$IRR_r \geq r \quad (8)$$

i.e. the net present value ( $NPV$ ) is equal to or greater than zero, and Internal Rate of Return ( $IRR$ ) is equal to or greater than the bank rate, which is considered to be a minimal, accepted rate of return by investors.

The above formulation presents the necessary and sufficient conditions to regard a given invention as an innovation at the planning stage and in the implementation stage. Condition (1) defines manufacturing success, conditions (3) and (4) determine market success, conditions (5) and (7) need to be satisfied to ensure manufacturing and market success and, finally, condition (8) is crucial for financial success. The last two conditions sum up all of the other conditions for success. In the light of the above definition, the incomplete perception of innovation as an activity combining science, technology, production and market is successfully overcome.

The complete set of these conditions describes an investment which is attractive for investors irrespective of the economic situation. The list includes both the traditional conditions of financial success – the real rate of return on sales is equal to or greater than the minimum return on sales, and the investment criteria used in capital budgeting –  $NPV$  is equal to or greater than zero and the Internal Rate of Return ( $IRR$ ) is equal to or greater than the discount rate. The adoption of the definition of innovation which refers to target costing in the context of discount cash flow [Mielcarek 2016, pp. 290-303] makes it possible to distinguish between an invention and an innovation, which is not possible when using the definition provided in the Oslo Manual. Whether or not a given invention is an innovation, can only be determined *ex post*, since it is only after implementing it in an organisation will it be possible to see if the implementation was successful. It follows that the

implementation of inventions in companies is an activity fraught with high risk and in most cases ends in failure.

The above definition highlights five fundamental and frequently underestimated or even overlooked aspects of innovation:

- there is no innovation without inventions, which raises the question of whether a given economy has the necessary conditions that facilitate and stimulate inventiveness;
- the number of attractive business ventures involving the implementation of inventions in a company, in other words, those that meet the conditions of success described by the rule of target costing, depends on the economic situation in a given country, which raises the next question: does the country's economic policy stimulate the economic situation or perhaps there is no economic policy and the country's economy is stuck in the middle income trap;
- the implementation of inventions is fraught with high risk, since one can only know whether the conditions of manufacturing, market and financial success have been satisfied through *ex post* assessment, which raises the following question: does the state undertake actions aimed at reducing the perception of this risk by inventors and companies;
- the implementation of an invention by a company, without checking whether the conditions of manufacturing, market and financial success are satisfied at the planning (pre-production) stage is like jumping into a pool without checking whether or not it contains any water, which raises the next question: does the state offer assistance to inventors who do not have the necessary skills or capital to conduct essential target costing analyses, in particular manufacturing analyses and market projections when they are planning to implement inventions in their own small and medium-sized companies or in companies they cooperate with;
- there are types of market (capitalist) economies which inhibit or even block the creation and implementation of inventions [Baumol 2002; Baumol, Litan & Schramm 2007], which raises the question whether the Polish economy is driven by an economic necessity to innovate and whether it provides positive incentives to implement inventions, and whether inventors and companies want and have to innovate.

Kleiber does not provide an explicit definition of innovation but it can be inferred on the basis of some of his statements. He talks about a system of implementing innovation or introducing innovations in the market [Kleiber 2011, p. 8]. On this basis one can draw a general conclusion that he does not distinguish between inventions and innovations, which means that his perception and analysis of reality is significantly limited in his report. It also affects his ability to recognise and take in the report presented the five main problems with economy innovativeness.

## 2.2. Innovation models

Reports on innovativeness of the Polish economy were not created in a science vacuum. There are many models of innovation in the literature:

- the supply model – it is a linear model (innovation pushed by technology) in which R&D work takes place outside companies, above all at universities and in other research units which are sources of innovation. It is classified as the first generation innovation model [OECD 1994, p. 13; Rothwell 1994, p. 8; Smith 2010, p. 105];

- the demand model – it is a linear model (innovation pulled by a market need) in which it is assumed that new products are created as a reaction to a market need or changes in demand and the appearance of a new innovation generates additional stream of revenue and causes another change of demand, which stimulates further innovation. It is classified as the second generation model of innovation. The idea of linearity is associated with the fact that innovation occurs as a result of a linear sequence of events, leading from fundamental research to the commercialization phase in the first generation model and from a market need to the launch of a new product in the second generation model [Schmookler 1965, p. 338; Rothwell 1994, p. 9; Kleinknecht & Verspagen 1990, p. 394];

- the coupling model (chain-linked model), which recognises interactions and feedback loops between elements involved in the creation of innovation; on the one hand, the model accounts for idea generator as the initial step for research, design and development, on other hand, it recognises the needs of the market. The model combines the supply and the demand models by accounting for interactions and feedback loops between their elements and the needs of society and the state of technological development. It was classified as the third generation model of innovation [Kline & Rosenberg 1986, p. 290; Rothwell 1994, pp. 9-10; Fisher 1999, pp. 11-27];

- the integrated model, according to which the company's project team takes advantage of both internal connections (between different departments) and external connections (with suppliers) at different stages of the innovation process, particularly in order to facilitate the exchange and use of information. It is classified as the fourth generation model of innovation [Rothwell 1994, p. 12; Smith 2010, p. 127];

- the network model [Rothwell 1994, p. 27; Smith 2010, p. 119] which is the sum of the fourth-generation model and the additional essential feature consisting in the speed of implementing innovations to market. Rothwell [1994, p. 13] stresses this aspect: "Being a 'fast innovator' is seen increasingly as an important factor determining the company's competitiveness, especially in areas where rates of technological change are high and product cycles are short." He identifies 24 factors affecting the development speed and efficiency [Rothwell 1994, pp. 15-22],

- the open innovation model [Chesbrough 2003a; 2003b; 2006; Trott 2005, p. 28] – the central idea behind open innovation is that a company develops and implements innovation in the existing or new market by relying on free or cheap internal knowledge as well as external knowledge, which is available in the domestic or foreign market and by cooperating with domestic and foreign companies;
- the innovation system model, which represents an approach focusing on the institutional structure of innovation systems at the global and national level [Niosi, Saviotti, Bellon & Crow 1993; Niosi & Bellon 1994], at the regional level [Amin 1999] or at the sectoral level [Breschi & Malerba 1997; Malerba 2002], and emphasises the role of knowledge and learning as an interactive process, which takes place inside an organisation and in interactions with external entities [Lundvall & Johnson 1994; Cooke 2001].

The above models are characterized by a transition from simple approach to increasingly complex ones, and their development to a large extent are based on an analysis of historical process. Leaving unresolved the question of whether the models explain the process of creating and commercialising inventions in the most developed countries and whether some of the models can be treated as normative when applied as an analytic tool to the Polish economy, there are two questions that need to be answered. First, do the models represent the specific characteristics of the Polish economy and can they be used to explain the problem of its low innovation performance and, secondly, whether they are normative models that provide useful tips on how to form in Poland an efficient system of creation and implementation of inventions.

Kleiber makes an explicit reference to the open innovation model [Kleiber 2011, pp. 12-13], and indirectly to the innovation system model. In this way, his emphasis is placed on weaknesses of the state, the system of scientific research and education and few connections between the Polish and international economy. Speaking of the specific character of the Polish economy, Kleiber argues that our model of development, owing to the distinctiveness of civilizational development makes it impossible to copy solutions used in other countries. It is necessary to create the Polish own model. Such a model has not been created yet and, in particular, coherent model of commercialising innovations in Poland does not exist. [Kleiber 2011, p. 8].

### **3. Manifestations of state weakness**

The 10 points of the Kleiber's report describe how things should be. In the meantime, their text contains harsh criticism that things are not as they should be. The report is largely focused on describing symptoms of state weakness.

The first point [Kleiber 2011, pp. 2-3] is devoted to such general areas as imprudent government, ineffective and overregulated legislation, lack of modern infrastructure and strict fiscal discipline. The main weaknesses include:

- lack of a strategic vision of development,
- uncontrolled growth of administration and legislation,
- lack of a modern vision of public administration,
- inconveniences for small and medium-sized businesses,
- a weak health care system,
- lack of measures to counteract economic emigration,
- no increase in spending on modernisation activities
- lack of measures to counteract demographic problems.

The main state weakness is the lack of a strategic vision of development supported by a matching level of expenditure on modernisation.

In the second point [Kleiber 2011, pp. 3-4], which focuses on the scope and manner of public discourse, the author points out that there is no system of making rational decisions that are broadly accepted by society. This would require a broad involvement of society in the transformation processes. The current state of affairs could be overcome by introducing the principles of deliberative democracy. Unfortunately, in the absence of such a system, the Polish society, administration and economy are characterised by a low culture of innovation.

The third point [Kleiber 2011, pp. 4-5] deals with the lack of a cross-sectoral, anticipatory strategy of development, in other words, the lack of visionary leadership. This is manifested by the lack of essential coordination at the government level, where the strategy of research development is the task of the Ministry of Science and Higher Education, innovation is the responsibility of the Ministry of Economy, computerisation and e-government are to be implemented by the Ministry of Internal Affairs and Administration, and the distribution of the biggest share of modernisation funds is the responsibility of the Ministry of Regional Development. A cross-sectoral development policy is a necessity, which remains unaddressed in the absence of a national centre for strategic studies.

In the fourth point [Kleiber 2011, pp. 5-7] the author draws attention to the low level of human and social capital. Unfortunately, it cannot be increased given the lack of sufficient measures and funding, which should be considered a priority development investment.

The sixth point [Kleiber 2011, pp. 8-10] concerns the lack of a system of introducing innovations. According to Kleiber, this is first due to the lack of knowledge about (failure to understand) the complexity of the phenomenon, which is described in the most comprehensive way in the innovation system model, and secondly, due to the spread of harmful stereotypes about innovation activity. As a result, the state is incapable of creating a cross-sectoral policy. To illustrate the scale of state weakness in this respect Kleiber poses a rhetorical question: “Is

there anything that prevents us from adopting solutions tested in other countries, the so-called good practices in the area of innovation, such as the methodology of creating a national innovation strategy and a system of education oriented towards international cooperation which exists in Sweden, France's research tax credit, the Japanese system of intellectual property laws, methods of stimulating the venture capital market, ways of setting development priorities and the creation of knowledge clusters in Finland, public procurement of innovation in the UK, or the novel approach to public-private partnership in Austria" [Kleiber 2011, p. 9].

The Kleiber's report states, so far the way for effective funding of innovative projects in pre-production phase has not been found. The same is true of the implementation phase in a company. Without solving this problem it will not be possible to create an effective model of implementing innovation.

A very important issue in this context is the creation, observance and application of intellectual property laws. It should be noted that a Polish inventor and innovator is defenceless against large enterprises and multinational corporations. Therefore the goal is not merely to create a legal system that protects intellectual property but also to make sure that the state supports inventors and innovators when their intellectual property rights are violated. The state can no longer afford to remain passive in this area because it will lead to the continuation of the low innovation performance of the Polish economy.

With respect to the importance of activities aimed at protecting industrial property right, Kleiber notes [2011, p. 8] that in terms of the number of patent applications filed at the European Patent Office (per million inhabitants) Poland is in the bottom group of countries included in the European Innovation Scoreboard [European Innovation Scoreboard 2009, pp. 56-57]. The number of Poland is 3.4, against the EU average of 114.8, and 330.4 for the three European leaders (Switzerland, Germany and Sweden). The two indicators are 33.8 and 97.2 times higher, respectively. Can there be a more obvious symptom of state weakness, which is indicative of the state's incapability to create a consistent and effective innovation policy that could establish appropriate conditions for Polish inventors and inventions developed in Polish companies as a result of applying the recommendations set out in the open innovation model?

In the seventh chapter [Kleiber 2011, pp. 11-12] attention is directed to the lack of industrial policy. It should be oriented towards creative specialisation and the development of industrial forms that pursue it. Unfortunately, no such set of technological niches that could be our specialisations has been created. To ensure success in this area the industrial policy would have also to result in the accumulation of people, institutions, competences, equipment and financial resources.

One essential element of an industrial policy, which can be inferred from the innovation system model and the open innovation model are mechanisms of creating clusters. Bringing together in one location enterprises and other organisations



that conduct complementary activities associated with creation and implementation of inventions would make it possible to form conditions for increasing the innovation performance of the Polish economy.

With respect to Kleiber's views on the need to get involved in renewable energy [Kleiber 2011, p. 12], one can point out the state's exceptional weakness in creating financial conditions for the stable functioning of renewable energy sources (RES) [Mielcarek 2014b, pp. 155-172]. The author of this paper can add to Kleiber's considerations that for many years the Polish parliament was not able to adopt a new act on RES in the situation of deteriorating financial condition of the industry. To illustrate this situation, it is worthwhile to quote the alarmist opinion expressed by the Polish Renewable Energy Coordination Council: "The Polish Renewable Energy Coordination Council, representing 19 trade associations and several hundred entrepreneurs hereby informs the public, government agencies and legislative bodies that the growing threat of bankruptcy faced by companies that in recent years have launched investment projects in Polish power industry worth over a dozen billion of PLN, has entered a critical phase!" [Polish Renewable Energy Coordination Council 2013]. Following Kleiber's rhetoric [Kleiber 2011, p. 9], one can ask once again if there is anything that prevents us from adopting solutions used in Germany to create legal conditions which enabled Germany to stimulate a rapid development of wind-generated energy and fast technological progress in the production and assembly of wind turbines [Mielcarek 2014b, pp. 167-168].

#### **4. Weaknesses of the system of scientific research and education**

In his report, Kleiber mentions a number of weaknesses of the scientific research system [Kleiber 2011, pp. 7-8]:

- the research sector in Poland does not provide attractive employment prospects for the brightest graduates and is not the source of innovative ideas for the economy,
- ineffective organisation and chronic underfunding of the R&D sector has given rise numerous weaknesses or even pathologies,
- the number of ambitious scientists capable of doing world top-level research has dramatically declined,
- academic entrepreneurship is underdeveloped,
- innovative researchers do not receive a sufficient share of profits from each successful innovation,
- more attention should be paid to chronic under-funding R&D sector.



Analyzing the research system weaknesses Kleiber [2011, p. 8] drew attention to one of the main indicators characterizing the level of innovation in the economy, which is the share of state and companies R&D expenditures in GDP. Kleiber emphasizes [Kleiber 2011, p. 8] that this indicator belongs to the group of the worst for Poland in a set taken into account in the European Innovation Scoreboard report [European Innovation Scoreboard 2009, pp. 56-57]. This issue needs to be analysed more closely. In 2009 the share of GDP spent on R&D by the Polish state was equal to 0.41% compared to the EU-27 average of 0.67%. The corresponding expenditure by companies was 0.19% compared to the EU average of 1.21. A comparison with the three leading countries is even less favourable. The state expenditure in the leading EU countries (Ireland, Sweden and Finland) accounts for 1.02 of the GDP, which is 2.5 times more than in Poland. The much greater gap exists for the share of companies spending on R&D in GDP. For EU leaders (Sweden, Finland and Denmark), this ratio is 2.48, which is 13 times higher than the rate for Polish companies. Kleiber's analysis of R&D expenditure is summed up with the following statement: "Expecting Polish scientists to make a substantial contribution to the country's development does not appear to be very rational" [Kleiber 2011, p. 8].

M. Kleiber lists the following weaknesses of the educational system [Kleiber 2011, pp. 5-7]:

- the state has failed to create a top league of best universities, comparable to world class universities,
- the popularity of university education and its dynamic development has largely decreased its quality,
- schools of all types are suffering from the instrumentalisation of knowledge,
- the state has not created conditions for general lifelong learning,
- no fundamental changes have been introduced at universities,
- an average university graduate is not able and does not want to keep learning, is not open to new developments and is not aware of their own creativity, is not capable of independent thinking and making a constructive contribution to a team; has not acquired the principles of entrepreneurship, does not have a good command of English or another foreign language,
- a low level of human capital, which is essential for increasing the innovative performance of the economy (its level depends on three factors: the number of educated people, the quality of knowledge they have acquired and the conditions enabling them to use the acquired skills).

Only the first factor is at a satisfying level, though according to some commentators, the number of people with higher education is excessive. Some serious objections are made as to the quality of knowledge acquired by university gradu-

ates, and their mass emigration in recent years is an indication that they have not found favourable conditions to use their skills and knowledge in our country.

## 5. Limited connections with international economy

The eighth point of the decalogue [Kleiber 2011, pp. 12-13] addresses the lack of a strategic foreign policy in the context of the open innovation model. Kleiber perceives this model, above all, from the international perspective and lists four major weaknesses manifesting the lack of openness to the world, which may indicate the existence of impediments to activities in accordance with the open model:

- low participation of companies in foreign activity,
- extremely low participation of Polish scientists in international research projects,
- very limited and few relations maintained by Polish universities and innovative companies with their counterparts in the US, Canada or Japan,
- surprisingly low enrolment of foreign students in Polish universities.

Under these conditions, activities intended to implement the model of open innovation, without which the innovative performance of the Polish economy cannot be improved, are only marginally important and are not supported by a consistent foreign policy.

## Conclusions

It can be concluded that M. Kleiber's report provides a comprehensive description of weaknesses of the state, the scientific research system and the educational system and the low level of relations with international economy, as well as a lack of an appropriate foreign policy in this respect. In this way the report offers *know-what*, which refers to principles of the innovation system model and focuses on institutional factors. The resulting picture of the state is one that is in fact absent from the areas which are generally regarded as crucial for improving the innovative performance of the economy.

This raises the question about the second kind of knowledge to be found in the report, which explains the facts, i.e. *know-why*. Already discussed the reasons for the low level of innovativeness that are listed by Kleiber can be divided into two groups:

1. Causes rooted in the awareness of politicians and society:
  - many politicians do not see the need to create a model of pro-development changes in the functioning of the state
  - lack of preparedness to face challenges,
  - lack of belief in success,

- the existing awareness of decision makers,
  - harmful stereotypes concerning innovation processes,
  - lack of understanding of the process of introducing innovations in the market,
  - low culture of innovation.
2. Causes associated with the lack of essential solutions in this area:
- a convincing model of pro-development changes in the functioning of the state,
  - fundamental principles of an innovation strategy of the country's development,
  - lack of a consistent, modern vision of the role of administration,
  - lack of essential changes as a result of political negligence,
  - lack of strong, competent coordination at the government level,
  - ineffective organisation and chronic underfunding of the R&D sector, as a result of many years of negligence,
  - lack of a consistent model of introducing innovations in the market.

Explanations of this kind are not sufficient. The appeal to the reasons in the sphere of consciousness is rather part of *know-what*, and not part of an explanation of the low level of innovativeness. These kinds of social consciousness also require explanations; for example, one wonders why many politicians do not see the need to create a model of pro-development changes in the functioning of the state or why there is a lack of understanding of the extremely complicated process of introducing innovations in the market. This kind of explanation ran out of the Kleiber's report.

Pointing to the lack of the necessary solutions also not be considered as an explanation. In fact, they are just another manifestation of the low innovative performance of the economy and statements of this kind are part of *know-what*, not *know-why*. They, too, require explanations, such as, for example, answering the question why there is no convincing model of pro-development changes in the functioning of the state or why there is no consistent model of introducing innovations in the market. Failure to provide such explanations is probably the reason for the air of helplessness and pessimism pervading the report.

The definition of innovation provided in the in sub-paragraph 3.1 implies five key research problems. Only one of these problems, formulated as a question whether in a given economy there are conditions facilitating and stimulating inventiveness, was addressed by providing a partial solution. No attention was devoted to the remaining problems, i.e. whether the country's economic policy stimulates the economic situation and thus increases the number of attractive business ventures, including innovation projects; whether the state undertakes actions aimed at reducing the perception of risk by inventors and companies, whether the state offers assistance to inventors and small and medium-sized business who do

not have the necessary skills or capital to conduct essential analyses, in particular manufacturing analyses and market projections and whether the Polish economy is driven by an economic necessity to innovate and whether it provides positive incentives to implement inventions, that is, whether the inventors and companies want and need to implement inventions were not in the report taken. This omission confirms the view that the definition of innovation adopted by Kleiber largely determines the perception of research problems which should be solved.

The process of knowledge management presented in the report also included the process of knowledge application. It should involve the transfer of knowledge from the stage of diagnosis to the stage of implementation. J. Hausner, co-author of another well-known report [Geodecki et al. 2012], states that it is time to move from diagnosing to implementations [Hausner 2012]. This view implies that, firstly, correct diagnosis has been made and, secondly, all that remains to be done is to move on to the implementation phase, which, unfortunately, has not been done. While the second view seems to be basically correct, judging on the basis the innovation indicators presented earlier, one cannot agree that the problems have been correctly diagnosed and there is no need to continue the process of diagnosis. Demonstrated weaknesses of the examined diagnosis do not apply to descriptions of the low innovative performance of the economy, but to the lack of sufficient explanations of its underlying causes. Without this element of knowledge it is impossible (or extremely difficult) to formulate consistent and effective recommendations aimed at bring about a fundamental breakthrough in the innovative performance of the Polish economy.

Undoubtedly, the deterioration of the macroeconomic and microeconomic indicators in the period 2006-2013, despite the large expenditure on innovation in the financial fourth frame should be considered a surprising phenomenon. One possible explanation can be found in the writings of K. Popper, who believes that “the purpose of science is to provide *good explanations* for everything that we believe requires explanation” [Popper 2002a, p. 231]. What, then, requires explanation in social sciences? Popper gives the following answer: “the main task of the theoretical social sciences... is to trace the unintended social repercussions of intentional human actions” [Popper 2002b, p. 460]. In other words, Popper adopts an ontological assumption that intentional human actions lead to unintended social consequences. Kleiber’s diagnosis does not seem to be based on this ontological assumption and does not contain any analysis of its consequences, since explanation requires systemic research. It is another argument to support the view that not everything has already been explained.

This view can be further supported by the argument that because the diagnoses were made since 2011 and were not followed by the implementation of their conclusions, the mere absence of such a transition should become one of the key

elements of the diagnosis Unfortunately, this aspect of the low innovation performance of the Polish economy has not been the subject of any studies.

In conclusion, it can be said that in view of the lack of sufficient explanations for the low innovation performance of the Polish economy and the failure to move from the phase of diagnosis to the phase of implementation, as well as the failure to address key research problems resulting from the adopted definition of innovation and take better account of achievements of the literature concerning the innovation models, there is a need to further diagnose low level of innovativeness of the Polish economy. The author of this article personally sees this need and will respond to it conducting further research.

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### O potrzebie dalszego diagnozowania niskiej innowacyjności polskiej gospodarki

**Streszczenie.** Celem artykułu jest analiza jednego z najbardziej znanych raportów dotyczących innowacyjności polskiej gospodarki, autorstwa M. Kleibera. Narzędziem badawczym były przedstawiona przez autora artykułu definicja innowacji oraz opisane modele innowacji. Wybrane wskaźniki makroekonomiczne i mikroekonomiczne posłużyły do oceny poziomu innowacyjności gospodarki. W okresie czwartej ramy finansowej (2007-2013 – pakiet Barroso) zwiększył się dystans Polski wobec UE pod względem innowacyjności. Raport Kleibera „Mądra Polska” w sposób wyczerpujący przedstawia przejawy słabości państwa, słabości systemu badań naukowych i edukacyjnego oraz niski poziom powiązań z gospodarką międzynarodową. Państwo *de facto* nie istniało w obszarach uznawanych za istotne dla kształtowania innowacyjności gospodarki. Wątpliwości co do tej diagnozy nie dotyczą opisów niskiej innowacyjności gospodarki, lecz braku wystarczających wyjaśnień, jakie są tego przyczyny. Wobec tego oraz niepodejmowania istotnych problemów badawczych wynikających z przedstawionej definicji innowacji, a także nieistnienia wyjaśnienia braku przejścia od fazy diagnozy do fazy realizacji zachodzi potrzeba dalszego diagnozowania niskiego poziomu innowacyjności gospodarki.

**Słowa kluczowe:** definicja innowacji, modele innowacji, rachunek kosztów docelowych, sukces finansowy, inwencja