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INNOVATION OF LUBLIN REGION AGAINST SELECTED REGIONS OF CENTRAL AND EASTERN EUROPE

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Анотація. Метою статті є представлення порівняльного аналізу інноваційної діяльності Люблінського воєводства порівнянно з окремими регіонами Центральної і Східної Європи, що дозволяє діагностувати поточну ситуацію і дати відповідь, які регіони з порівняльною специфічністю можна висвітлюватися як більш-менш інноваційні. Водночас дослідження дає змогу перевірити, чи правильно розроблені конкретні ринкові переваги в досліджуваному регіоні Люблінським воєводством, і чи може він створити потенціал, щоб активізувати розвиток на роки вперед. Предметом цього дослідження є також визначення тенденцій, які з'явилися в 2007–2011 роках для того, щоб перевірити напрямок змін в окресленому регіоні порівнянно з іншими регіонами, а також виявити ті сфери, які потребують поліпшення для підвищення динаміки розвитку за допомогою інновацій.

Аннотация. Целью статьи является представление сравнительного анализа инновационной деятельности Люблинского воеводства по сравнению с отдельными регионами Центральной и Восточной Европы, позволяет диагностировать текущую ситуацию и дать ответ, какие регионы со сравнительной специфичностью можно рассматривать как более или менее инновационные. В то же время исследование позволяет проверить, правильно ли разработаны конкретные рыночные преимущества в исследуемом регионе Люблинским воеводством, и может ли он создать потенциал, чтобы активизировать развитие на годы вперед. Предметом данного исследования является также определение тенденций, которые появились в 2007–2011 годах для того, чтобы проверить направление изменений в рассматриваемом регионе по сравнению с другими регионами, а также выявить те сферы, которые требуют улучшения для повышения динамики развития с помощью инноваций.

Summary. The purpose of this paper is to present a comparable analysis of innovation in Lublin Region compared to selected regions of Central and Eastern Europe. It should allow to diagnose a current situation and provide the answer, which regions with comparable specificity may be viewed as more or less innovative. At the same time it would be possible to verify whether Lublin Region developed specific market advantages in the investigated area, and whether it may build up the potential to intensify the development for the years to come. The subject of this research is also to identify tendencies which appeared in the years 2007–2011 in order to verify the direction of the change in the examined region compared to other regions, as well as to identify the areas which require improvement for increasing development dynamics by means of innovation.

Ключові слова: *інновація, регіон, витрати на науково-дослідну роботу.*
Ключевые слова: *инновация, регион, расходы на научно-исследовательскую работу.*
Key words: *innovation, region, R&D expenditures.*

Statement of the problem. Over the last few years innovations have become one of the most significant research areas. They are viewed both in respect of business entities and building up market advantages, which would enable outrunning the competitors and winning new markets [2, p. 1–34], as well as in respect of economic development of different countries [3, p. 107–116]. It is worth noting, however, that the issues of innovation are increasingly more associated with the issues of regional development [1, p. 875–891].

In this context the issues connected with building up potential for dynamic development of enterprise in the region as well as supporting local initiatives which aim to strengthen innovation become of major importance. In the subject

literature much attention is paid to active regional policy oriented towards backing up local entrepreneurs while realizing innovative projects and creating conditions which will attract innovative investments from outside. One of the key areas allowing to run activities fostering actions in this respect, is the creation of a chain of institutions of business environment which makes the process of innovation diffusion easier [5, p. 1057–1076].

The subject literature distinguishes five key areas in which region innovation is analyzed and where opportunities to develop locally are looked for. Following the A. l. Claros model these are the following [4, p. 1-8]:

- Legal and regulatory framework,
- R&D,
- Using communication and information technologies,
- Institutional environment,
- Human capital, education and social coverage [7, p. 224].

These areas have also become essential for analyzing the state of regional innovation of the European Union presented in Regional Innovation Scoreboard 2012 (RIS) [8, p. 1–76]. The research findings published there show noticeable spatial diversity which results from uneven economical development of particular countries on the one hand, and the lack of the proper regional policy oriented towards enhancing innovation, on the other. Therefore, a number of activities have been initiated which aim to change this situation through implementing strategic approach and working out regional innovation strategies. This direction proves to be the right one, though the actual effects still remain to be seen in the long perspective.

The purpose of this paper is to present a comparable analysis of innovation in Lublin Region compared to selected regions of Central and Eastern Europe. It should allow diagnosing a current situation and providing the answer, which regions with comparable specificity may be viewed as more or less innovative. At the same time it would be possible to verify whether Lublin Region developed specific market advantages in the investigated area, and whether it may build up the potential to intensify the development for the years to come. The subject of this research is also to identify tendencies which appeared in the years 2007–2011 in order to verify the direction of the change in the examined region compared to other regions, as well as to identify the areas which require improvement for increasing development dynamics by means of innovation.

Research Methodology and sample. To carry out the comparative analysis of the innovation in Lublin Region with the regions of Central and Eastern Europe, 15 units of similar economical profile were selected out of 8 countries. The research does not cover Lithuania, Latvia and Estonia because they did not mark off regions in their political structure. Additionally, the research excludes Belarus and Ukraine as they are not covered by Regional Innovation Scoreboard 2012 and the data collected from the state reports did not ensure comparability of the results. The selection criteria cover the size of a region (taking into account the differences appearing in different countries), income per capita, and industry characteristics. Table 1 shows the regions from particular countries which were qualified to the comparative analysis.

To compare innovation in particular regions there were used some selected factors included in RIS and the time span covered the years 2007, 2009, 2011. The following parameters are subject of the study: population with tertiary education, public R&D expenditures, business R&D expenditures, non-R&D innovation expenditures, SMEs innovating in-house, EPO patents, technological (product or process) innovators, non-technological (marketing or organizational) innovators, employment in medium-high/ hightech manufacturing & knowledgeintensive services).

To identify the differences between different regions it was assumed that the parameters examined hold the same impact on regional innovation, and therefore, their share in the integrated index is the same. Additionally, indexes got standardized on a scale 0-1 with the assumption that a region with the lowest value is assessed at the level 0, while the one with the highest -1. Analogical methodology was applied in the case of elaborating Regional Innovation Scoreboard, wherein the values of parameters studied vary as a larger number of region took part in RIS.

For comparison of regions there were used both the integrated index (average for all the examined parameters) and the area index: expenditure on innovation, innovative activity and innovation of the job market.

Table 1

The checklist of regions from particular countries qualified to the comparative analysis

No.	Region	Country
1	Lubelskie	Poland
2	Podkarpackie	
3	Podlaskie	
4	Warmińsko – Mazurskie	
5	Dél – Alföld	Hungary
6	Észak – Alföld	
7	Severovychod	Czech Republic
8	Jihovychod	
9	Severna i iztochna Bulgaria	Bulgaria
10	Sredisnja i Istocna (Panonska) Hrvatska	Croatia
11	Nord-Vest	Romania
12	Centru	
13	Nord-Est	
14	Vzhodna Slovenija	Slovenia
15	Stredne Slovensko	Slovakia
16	Vychodne Slovensko	

Source: prepared by the author

Lublin Region innovation against other regions of Central and Eastern Europe – integrated index.

As the data from Table 2 show, in 2011 Lublin Region was placed in the middle of the ranking of selected regions of Central and Eastern Europe. The result at the level of 0,347 appeared to be similar to those of the other two examined regions in Poland (Podkarpackie and Podlaskie) and much higher than the result of Warmińsko – Mazurskie Region. Compared with regions from other countries, one should note that the innovation of Lublin Region is lower than that one of the regions from the Czech Republic, Slovenia, Hungary and one Slovakian region. Particularly, while comparing with these two first countries the distance appears to be significant and proves negligence in this area. Therefore, Lublin Region has got and is likely to still have problems with creating con-

Table 2

Integrated index value and position in innovation ranking of selected regions of Central and Eastern Europe

Country	Region	Inegrated index value			Ranking position		
		2007	2009	2011	2007	2009	2011
Poland	Lubelskie	0,473	0,532	0,347	4	5	8
	Podkarpackie	0,428	0,546	0,352	8	4	7
	Podlaskie	0,448	0,405	0,341	6	9	9
	Warmińsko – Mazurskie	0,361	0,393	0,294	9	10	12
Hungary	Észak – Alföld	0,447	0,392	0,366	7	11	6
	Dél – Alföld	0,456	0,474	0,390	5	6	5
Czech Republic	Severovychod	0,711	0,649	0,780	2	3	2
	Jihovychod	0,829	0,810	0,805	1	1	1
Bulgaria	Severna i iztochna Bulgaria	0,260	0,347	0,313	13	13	10
Croatia	Sredisnja i Istocna (Panonska) Hrvatska	0,211	0,273	0,173	16	15	16
Romania	Nord-Vest	0,256	0,345	0,263	14	14	14
	Centru	0,238	0,255	0,257	15	16	15
	Nord-Est	0,344	0,431	0,300	10	8	11
Slovenia	Vzhodna Slovenija	0,668	0,768	0,664	3	2	3
Slovakia	Stredne Slovensko	0,335	0,437	0,400	12	7	4
	Vychodne Slovensko	0,343	0,387	0,267	11	12	13

Source: prepared by the author on the base on RIS

siderable competitive advantages which would enable winning important external investors, given that the main competitors in this area, i.e. Czechs, Hungarians and Slovaks outperform in this field.

In 2011 the integrated index for Lublin Region was higher than the one for examined regions from Romania, Bulgaria and Croatia. It is well worth noting, however, that the distance from the regions from these countries is continually changing, which may bring about much unfavourable consequences in the future.

While analyzing variability in time of the Lublin Region position in the innovation ranking of some regions of Central and Eastern Europe, one may easily see a very negative downturn of the position. In 2007 the result at the level of 0,473 allowed to be ranked fourth, behind the regions from the Czech Republic and Slovenia. Thus, not only the regions with a lower level of development from Romania, Bulgaria or Croatia were outrun, but, what is more important, also the investigated regions from Poland as well as Hungarian and Slovakian ones. Yet, over four years Lublin Region recorded a fall of the examined index by 0,125, which resulted in lowering in the ranking by as many as 4 positions down (the biggest fall among those examined).

This unfavorable situation makes one think which innovation areas reflect the biggest recession and in which areas Lublin Region may see the chance to change this unvfavourable downturn tendency. The issue in this respect is discussed in the further part of this paper.

Innovation expenditure of Lublin Region against other regions of the European Union. One of the key barriers of innovation development in regions are financial means allocated either on research and development or directly on the purchase of innovative solutions. Both public funds and business units themselves may constitute the source for this capital. As the data from Table 3. indicate in 2011 Lublin Region was ranked seventh in the examined area, i.e. close to the integrated index. Higher values were obtained by the regions in the Czech Republic, Slovenia and Hungary. What is more, Lublin Region was outdistanced by one of Romanian regions (Nord-Vest).

The expenditures on research and development are these very areas which in the period 2007–2011 much affected the dramatic decrease in the evaluation of Lublin Region, as already described in the previous part of the paper. As early as in 2007 the average index for the area tested was

Table 3

Value of indexes related to expenditures on R&D and innovation in selected regions of Central and Eastern Europe in 2011

Country	Region	Public R&D expenditures	Business R&D expenditures	Non-R&D innovation expenditures	The average for examined parameters	Ranking position
Poland	Lubelskie	0,82	0,04	0,53	0,46	7
	Podkarpackie	0,12	0,50	0,44	0,35	11
	Podlaskie	0,42	0,31	0,64	0,46	8
	Warmińsko – Mazurskie	0,39	0,17	0,63	0,40	9
Hungary	Észak – Alföld	0,79	0,81	0,00	0,53	5
	Dél – Alföld	0,85	0,56	0,24	0,55	4
Czech Republic	Severovychod	0,27	1,00	1,00	0,76	2
	Jihovychod	1,00	0,88	0,66	0,85	1
Bulgaria	Severna i iztochna Bulgaria	0,06	0,17	0,68	0,30	13
Croatia	Sredisnja i Istocna (Panonska) Hrvatska	0,00	0,00	0,22	0,07	16
Romania	Nord-Vest	0,67	0,23	0,54	0,48	6
	Centru	0,00	0,17	0,53	0,23	14
	Nord-Est	0,58	0,17	0,32	0,35	10
Slovenia	Vzhodna Slovenija	0,18	1,00	0,49	0,56	3
Slovakia	Stredne Slovensko	0,12	0,35	0,58	0,35	12
	Vychodne Slovensko	0,21	0,29	0,07	0,19	15

Source: prepared by the author on the base on RIS

0,65, which gave the third position in the ranking, just behind the regions from the Czech Republic. However, unfavourable changes which took place in 2007–20011 resulted in the fall of the average evaluation of Lublin Region by 0,19. A bigger fall was only recorded in Vychodne Slovensko Region in Slovakia.

A key factor which affected the situation is expenditure on research and development financed by enterprise's assets. In 2011 this index was merely 0,04 and was higher than one region only – Sredisnja and Istocna (Panonska) Hrvatska from Croatia. One should point out that, in 2007 the value of the discussed index was nearly five times higher and came to 0,38, which allowed to outrun as many as 8 regions. The reasons of the ensuing situation should be seen mainly in the fact that there appear considerable public funds, including those distributed within the Operational Programme – Innovative Economy and also in the framework of the projects funded by the National Centre for Research and Development. Consequently, it made public funds to be driven out by public funds in this investigated area. So it seems these funds do not bring an impulse to activate enterprise innovation but they are merely the way to decrease the investment burden on enterprises, thus, shifting it onto the public sector.

The issue of decrease in innovation activity of enterprises in Lublin Region is also evident in a significant decrease in expenditures on innovation which did not follow from the research and development activities but were raised directly on the market. In 2007 enterprises from Lublin Region were in the lead among others from the examined regions not to be equal only to the enterprises from the Rumanian Region Nord-Est. Unfortunately in 2007–2011 the index dropped nearly by half from the level of 0,93 to the level of 0,53. On the one hand it resulted from the lowering investment activities of the Lublin Region enterprises, and on the other hand, from starting stimulating operations in other regions. Therefore, it is desirable to consider what actions should be taken to increase activity of business entities in the subsequent years, which, as the above mentioned study showed, are essential for the improvement of the current situation.

Innovation activity in Lublin Region against other regions of Central and Eastern Europe.

The consequence of decreasing expenditures on research and development by enterprises from Lublin Region is their declining innovation activity. As the data from Table 4 demonstrate Lublin Region was ranked thirteenth in the examined area and it was overrun not only by regions from the countries with a high economic development (The

Table 4

Value of indexes related to innovation activity in selected regions of Central and Eastern Europe in 2011

Country	Region	SMEs innovating in-house	EPO patents	Technological (product or process) Innovators	Non-technological (marketing or organisational) innovators	The average for examined parameters	Ranking position
Poland	Lubelskie	0,10	0,36	0,08	0,08	0,16	13
	Podkarpackie	0,25	0,39	0,15	0,14	0,23	9
	Podlaskie	0,13	0,27	0,08	0,02	0,12	15
	Warmińsko – Mazurskie	0,13	0,12	0,03	0,00	0,07	16
Hungary	Észak – Alföld	0,00	0,58	0,03	0,13	0,18	12
	Dél – Alföld	0,04	0,70	0,00	0,13	0,22	10
Czech Republic	Severovychod	1,00	0,67	1,00	1,00	0,92	1
	Jihovychod	0,94	0,70	0,81	0,95	0,85	2
Bulgaria	Severna i iztochna Bulgaria	0,35	0,09	0,22	0,21	0,22	10
Croatia	Sredisnja i Istocna (Panonska) Hrvatska	0,19	0,67	0,12	0,17	0,29	6
Romania	Nord-Vest	0,21	0,03	0,03	0,32	0,15	14
	Centru	0,44	0,18	0,20	0,35	0,29	6
	Nord-Est	0,58	0,00	0,31	0,75	0,41	4
Slovenia	Vzhodna Slovenija	0,71	1,00	0,49	0,65	0,71	3
Slovakia	Stredne Slovensko	0,48	0,15	0,39	0,59	0,40	5
	Vychodne Slovensko	0,08	0,33	0,07	0,52	0,25	8

Source: prepared by the author on the base of RIS

Czech Republic, Hungary Slovakia or Slovenia) but also by regions from Bulgaria, Croatia or Romania. Additionally, the distance to the best regions from the Czech Republic and Slovenia was very large and proved a huge weakness of innovation of business entities from Lublin Region. The achieved index was only higher from Romanian region of Nord-Vest and two regions from Poland: Podlaskie and Warmińsko-Mazurskie. It must be emphasized that four years before the average index for Lublin Region was more than twice higher and amounted 0,37, which enabled it to be ranked sixth. Unfortunately more active in this respect were business units from regions in Hungary, Slovakia, Croatia and Bulgaria, which outdistanced the subject region in the ranking.

While analyzing the data in detail it may be noted that only in the case of new patents filed, Lublin Region obtained a satisfactory index at the level of 0,36 leaving behind 9 regions in the research sample. Moreover, it was the only area which marked improvement within four years. In the case of other analyzed parameters Lublin Region recorded a significant fall in the value to the level of 0,08–0,10. Thus, the worse indexes are only for individual regions and still worse, the distance to the best regions got much bigger.

The above situation is particularly unfavourable for a number of technological innovators, whereas these are the changes in the product and the manufacturing process or providing services which appear to be essential in order to build up a long – term competitive advantage cross-border. Such a low share of innovative enterprises makes any strong incentives for increasing investment rare, due to the lack of significant entities which would attract co-operants' investments. In this way one of the severest deficiencies of Lublin Region becomes evident, i.e. the lack of enterprises recognized internationally or at least cross-regionally which would through their technological changes contribute to the progress in other enterprises. Focus on the sales within the same region does not make business entities carry out innovative changes, and this, in turn, much reduces the chances to win big external innovative investments, which are quite often located in close proximity to modern and dynamically developing enterprises so as to exploit the synergy effect.

Job market innovation in Lublin Region against other regions of Central and Eastern Europe. The data from Table 5 demonstrate innovation of the job market is the only area in which Lublin Region came to a meaningful position in the ranking of 2011. Compared with 2007 the average

Table 5

Value of indexes related to innovation of job market in selected regions of Central and Eastern Europe in 2011

Country	Region	Population with tertiary education	Employment in medium-high/hight-ech manufacturing & knowledgein-tensive services	The average for examined parameters	Ranking position
Poland	Lubelskie	0,92	0,19	0,55	6
	Podkarpackie	0,92	0,25	0,58	5
	Podlaskie	1,00	0,19	0,59	3
	Warmińsko – Mazurskie	0,92	0,26	0,59	3
Hungary	Észak – Alföld	0,48	0,48	0,48	10
	Dél – Alföld	0,56	0,43	0,50	9
Czech Republic	Severovychod	0,08	1,00	0,54	7
	Jihovychod	0,44	0,87	0,65	2
Bulgaria	Severna i iztochna Bulgaria	0,72	0,32	0,52	8
Croatia	Sredisnja i Istocna (Panonska) Hrvatska	0,04	0,14	0,09	15
Roaunia	Nord-Vest	0,24	0,10	0,17	14
	Centru	0,16	0,29	0,22	13
	Nord-Est	0,00	0,00	0,00	16
Slovenia	Vzhodna Slovenija	0,76	0,70	0,73	1
Slovakia	Stredne Slovensko	0,40	0,54	0,47	11
	Vychodne Slovensko	0,24	0,58	0,41	12

Source: prepared by the author on the base of RIS.

index went up from the level of 0,43 to the level of 0,55, which put Lublin region ahead of Slovakia, Slovenia, Bulgaria and Hungary.

Regretfully, the detail study shows this positive change results from improvement only of one parameter, i.e. a share of population with higher education. Although this index determines the potential of innovation development in the region, it has no direct impact on technological or product changes in enterprises. It is more the consequence of educational policy of the government, which aims to lengthen the period of education. The observation is confirmed by a high assessment of all the regions in Poland, which is much higher compared with the assessments of the rest of the countries.

A high percentage of people with a higher education may but does not have to contribute to the improvement of the region innovation, and this efficiency is dependent on job opportunities, especially in innovative enterprises. The practice of the country shows, however, that the system of education is oriented towards training for nontechnical professions, more connected with servicing industry or providing services for the public. Thereby, a large part of population with a higher education does not stimulate the development of innovation, what is more, a high percentage of the unenemployed in this group proves this potential is not used appropriately. It is confirmed by much lower assessment of the second examined parameter, i.e. employment in the manufacturing sectors with a high and medium technology as well as in services exploiting knowledge. In 2011 this index was merely 0,19 and it was higher than those in two regions from Romania and one from Croatia, and at the same level as Podlaskie Region. It evidences low efficiency of the educational system in Poland, since a low percentage of university graduates come to entities determining the potential of the innovation in the Region.

Conclusions. The above study showed that Lublin Region compared with selected regions of Central and Eastern Europe, in terms of creating innovation is ranked much lower than expected by the local government. In addition much alarming is the trend of a quite dramatic fall of particular parameters compared with those from 2007, which widens the distance to the leaders from the Czech Republic and Slovenia on the one hand, and bridges the gap between it and the poorer regions from such countries as Romania, Bulgaria or Slovakia.

One of crucial reasons of innovation being lower than expected in Lublin Region, are insufficient expenditures of enterprise on both innovation purchases and realization of their own research and development projects. This is proved by survey results carried out within the framework of research grant nr NN 113 303038 sponsored by MNiSW (the Ministry of Science and Higher Education in Poland). It was called «Financial Instruments of Support for the Development of Innovation in Lublin Voievidshiop» and showed that the business entities from Lublin Region are reluctant to spend their resources on research because they cannot see here a long-term opportunity to create long-term market advantages which may come from innovation. If they run any innovation projects, these are mostly purchases of ready-made solutions from other enterprises or foreign research institutions, where the main impulse in this area are public funds transferred in the form of subsidies. Therefore, public funds drive out innovative activity of these very business units. Consequently, there is a little activity of enterprises in implementing innovation, including those essential for a long-term development of process innovations. It impacts adversely the situation on the job market as it affects the high level of unemployment among population with a higher education who are not able to find employment in traditional industries of the economy.

It is worth considering the changes which might fast and effectively contribute to the improvement of the current situation in the near perspective. One such opportunity seems to be a considerable increase in the enterprise's share in the projects co-financed by public funds. In this way the effect of driveout described in this paper and the aid will come to a much larger group of beneficiaries. Another task is to expand infrastructure which would make running business activity easier in the region and attract big and modern external investors. This, in turn, would have a strong impact on the process of innovation diffusion among co-operating regional enterprises. The third area which requires changes is the system of education which should be more oriented towards creating innovative approaches as well as educating for technical businesses and serving modern economy. Finally, it is well worth expanding the chain of institutions from business environment, which would be today far more than responsible for creating innovation and transfer of knowledge from research institutions into enterprises. They should also gather data on research directions in a more efficient manner, which can stand the chance to be commercialized in regional business entities.

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