In case of post-soviet countries it is hard to speak of hypermobility, as the rapid development in air transportation does not correlate with success in terms of socioeconomic development. It is more a result of a demand rooted in no alternatives for economic migration to more developed countries in Western and Northern Europe. If the financial crisis stays, it may turn out that the growth of air travel in post-socialist countries and the increase in mobility will be very short-termed. Another aspect worth considering is the psychological barrier which accompanies still many residents from these parts of Europe when planning a trip by plane.

REFERENCES

1. Adams J., 2005, Hypermobility: a challenge to governance, [in:] C. Lyall, J. Tait (eds.), New modes of governance: developing an integrated policy approach to science, technology, risk, and the environment, Ashgate, Aldershot, 123–138. 2. Adams J., 1999, The social implications of hypermobility, OECD Env. Directorate, Unclassified ENV/EPOC/PPC/T (99) 3/FINAL/REV1.
Anderson K, Bows A., 2008, Reframing the climate change challenge in light of post-2000 emission trends, Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 366:1882, 3863–3882. 3. Kenyon S., Lyons G., Rafferty J., 2002, Transport and social exclusion: investigating the possibility of promoting inclusion through virtual mobility, Journal of Transport Geography, 10, 207–219. 4. Kołoś A., Taczanowski J., Trzepacz P., 2012, Connecting airports with cities. Perspectives of air-rail links development in Central Europe, Prace geograficzne, 130, 107–129.

THE LEVEL OF KNOWLEDGE ECONOMY DEVELOPMENT IN UKRAINE AND EU COUNTRIES

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Abstract. *In recent decades, the world economy held radical changes that suggest the formation of a knowledge-based economy. Strengthening of knowledge capacity of economy is an important sign of postindustrial development. The paper consists of results of research of the level of knowledge capacity of economy, defined for the countries and regions in the European Union, as well as Ukraine. Correlation between the level of development of countries and regions and the degree of knowledge capacity of their economy is revealed.*

Смаль В.В. **Рівень знаннєємності економіки країн і регіонів Євросоюзу та України**. *Упродовж останніх десятиліть у світовому господарстві відбулись радикальні зміни, що дозволяють говорити про формування економіки знань. Посилення знаннєємності економіки – важлива ознака постіндустріальності розвитку. У статті представлені результати дослідження рівня знаннєємності економіки, визначеного для країн та регіонів Євросоюзу, а також для України. Виявлена залежність між рівнем розвитку країн і регіонів та ступенем знаннєємності їх економіки.*

Knowledge economy is one of the widely used names of the contemporary stage of the world economy development. Knowledge turned into the driving force of local, national and global development, became an independent factor of production along with such traditional factors as land, labor, capital. Technologically advanced national economies of the world are indeed based on knowledge.

Significance of studying various aspects of knowledge economy development is growing with the increasing its importance in the world in general and in any individual country, including Ukraine. Investigation of the knowledge economy is moving from descriptive to empirical and analytical study that requires the application of specific statistical information, indicators, and instruments for processing. The selection and proper systematization and interpretation of large amounts of data through the analysis is an important research task.

The cardinal reformatting of economic activity caused by increasing role of knowledge has become the subject of active scientific debate being conducted by representatives of different fields of studies. The most significant theoretical and practical achievements in the study of knowledge economy have foreign and native economists and sociologists in particular F. Machlup, P. Drucker, P. Cook , B. Godin, B.-A. Lundvall, L. Fedulova, A. Chukhno [2-8].

Geographers are able to provide spatial analysis of the sector that produces knowledge as well as industries that use those knowledge. In this regard, there is need to develop theoretical and methodological approaches to the study of the knowledge economy and their approbation. This paper and other author's article are is devoted to that subject area.

Knowledge economy can be analyzed in two ways: using (1) "input" and (2) "output" indicators. The first way provides estimation of total investment in the sector that produces and spreads new knowledge, which can be measured by the number of patents, the quality of human resources involved in R & D sector and in the economy as a whole. The intensity of production which is based on knowledge or in other words so called "knowledge-based economy" is analyzed involving "output" indicators.

Economic sectors that mostly use new knowledge include both high-tech industries and knowledge-intensive services. Eurostat developed aggregation of the manufacturing industry and service sectors depending on technological intensity.

According to Eurostat classification high-technology production includes manufacture of pharmaceuticals, medicinal chemicals and botanical products; office machinery and computers; radio, television and communication equipment and apparatus; medical, precision and optical instruments, watches and clocks; aircraft and spacecraft. Manufacture of chemicals and chemical product; machinery and equipment; electrical machinery and apparatus; motor vehicles, trailers and semi-trailers; other transport equipment belong to medium-high-technology industry. Such kinds of industries are characterized by high levels of investment in innovation, intensive advanced technology, and well-educated workforce.

Following similar approach as for manufacturing, Eurostat defines the following sector as knowledgeintensive services: water and air transport; post and telecommunications; financial intermediation; real estate, renting and business

activities; education; health and social work; recreational, cultural and sporting activities.

Currently available statistical information allows to compare knowledge intensity of Ukrainian economy in comparison with EU countries, involving the following indicators: 1) R&D expenditures (%, share of GDP); 2) R&D expenditures per capita (euro per capita); 3) number of patent applications to the European Patent Office (per million of inhabitants); 4) expenditures for information and communication technology (%,share of GDP); 5) number of Internet users (% of population, who used the Internet at least once a week); 6) share of researchers in total employment (%); 7) number of researchers (per million of inhabitants); 8) share of student in age group 20-29 years (%); 9) employment in high technology service (% of total workforce); 10) exports of high technology products as a share of manufacture product exports (%); 11) exports of high technology products as a share of total exports (%); 12) employment in high-tech and medium-high-technology manufacture (% of total work force).

The first eight indicators characterize the knowledge economy on the "input" that reveal the amount of R&D expenditures, the level of science development, and population involvement in research as well as to higher education. Other indicators show the level of the knowledge economy development on the “output” in other words they characterize knowledge intensive industries.

All the above mentioned indicators were used to determine the level of Ukraine knowledge economy development in comparison with EU countries. In order to do that integral coefficient of the knowledge economy development was calculated using equation which was fully well-founded by Kulynych R.O. [1]:

$$S_j = \sum_{i=1}^{n} \left(\frac{X_{\max} - X_{ij}}{X_{\max} - X_{\min}}\right) + \sum_{i=1}^{n} \left(\frac{X_{ij} - X_{\min}}{X_{\max} - X_{\min}}\right), \qquad (1),$$

where S_j – integral coefficient of the knowledge economy development j-country, $X_{\min}$ and $X_{\max}$ – minimum and maximum values of the initial indicators.

The coefficient was calculated for Ukraine, all EU countries and EU partner countries (Iceland, Norway, Switzerland) (Figure 1). Table 1 shows the integral coefficient of the knowledge economy development, as well as standardized values of all the indices.

The state provides minimal financial resources to support R & D system in working condition, but lack of funding leads to a deterioration of the human and technological capital, to worsening the ability to respond to the real needs of the economy and provide innovative strategies for economic growth.

According to the result of calculation, Ukraine, leaving behind Cyprus and Romania, ranked twenty-ninth place on integral coefficient of knowledge economy development. The integral coefficient ranges from 1.454 in Cyprus to 9.528 in Finland. For Ukraine its value is 2.020, which is 1.4 times more than the minimum and 4.7 times less than the maximum. In obedience to the evaluation results the level of knowledge economy development in Ukraine is similar to the level of the former socialist states and South European countries.

Table 1 – Integral coefficient and standardized indicators of knowledge economy development

	1*	2	3	4	5	6	7	8	9	10	11	12	13	14
Finland	9,528	0,899	0,959	0,959	0,676	0,603	0,838	0,383	0,35	0,538	0,966	0,83	1	0,526
Sweden	8,649	0,975	0,737	1	0,677	0,578	1	0,268	0,271	0,385	1	0,638	0,7	0,421
Iceland	8,030	1	1	0,713	0,265	0,101	0,973	0,7	0,322	0,25	0,639	1	0,594	0,474
Switzerland	7,634	0,823	0,506	0,776	1	0,656	0,649	0,421	0,399	0,673	0,591	0,344	0,218	0,579
Denmark	7,271	0,911	0,622	0,666	0,467	0,552	0,892	0,264	0,223	0,25	0,861	0,558	0,69	0,316
Luxembourg	6,490	0,861	0,488	0,36	0,437	0,021	0,514	0,072	0,669	0,596	0,983	0,42	0,069	1
Germany	6,359	0,81	0,348	0,659	0,654	1	0,541	0,219	0,253	0,327	0,59	0,362	0,228	0,368
Netherlands	5,979	0,962	0,276	0,401	0,606	0,228	0,73	0,404	0,366	0,5	0,433	0,107	0,439	0,526
UK	5,969	0,823	0,279	0,435	0,28	0,478	0,784	0,343	0,321	0,5	0,408	0,429	0,416	0,474
France	5,696	0,722	0,355	0,505	0,32	0,557	0,676	0,362	0,308	0,288	0,452	0,335	0,343	0,474
Norway	5,680	0,911	0,567	0,382	0,285	0,297	0,703	0,355	0,043	0	0,785	0,603	0,696	0,053
Malta	5,671	0,468	0,048	0,044	0,038	0,589	0,351	1	1	0,923	0,044	0,165	0	1
Austria	5,480	0,759	0,368	0,662	0,38	0,569	0,351	0,155	0,213	0,346	0,67	0,42	0,271	0,316
Ireland	5,469	0,658	0,259	0,265	0,195	0,519	0,595	0,496	0,526	0,173	0,433	0,263	0,297	0,789
Hungary	5,378	0,608	0,113	0,167	0,04	0,758	0,432	0,447	0,432	1	0,066	0,228	0,455	0,632
Belgium	4,989	0,722	0,34	0,461	0,322	0,576	0,63	0,104	0,116	0,288	0,456	0,375	0,442	0,158
Czech Republic	4,846	0,595	0,231	0,347	0,024	0,891	0,459	0,236	0,277	0,75	0,145	0,223	0,248	0,421
Slovenia	4,549	0,57	0,281	0,319	0,071	0,913	0,405	0,062	0,073	0,192	0,219	0,241	0,782	0,421
Estonia	4,348	0,696	0,237	0,211	0,019	0,385	0,378	0,155	0,142	0,942	0,104	0,286	0,581	0,211
Slovakia	3,332	0,696	0,176	0,006	0,009	0,885	0,351	0,045	0,07	0,481	0,029	0,223	0,254	0,105
Italy	3,306	0,392	0,078	0,233	0,162	0,669	0,405	0,074	0,103	0,231	0,222	0,125	0,452	0,158
Spain	3,191	0,557	0,243	0,262	0,055	0,378	0,378	0,043	0,065	0,212	0,232	0,295	0,366	0,105
Lithuania	3,169	0,544	0,202	0,117	0,006	0,149	0,189	0,174	0,132	0,404	0,045	0,214	0,782	0,211
Latvia	3,074	0,62	0,116	0,047	0,013	0,036	0,351	0,083	0,073	0,75	0,034	0,152	0,693	0,105
Portugal	2,696	0,392	0,195	0,243	0,009	0,223	0,108	0,111	0,114	0,442	0,166	0,241	0,294	0,158
Poland	2,482	0,481	0,087	0,041	0,006	0,421	0,216	0,043	0,039	0,346	0,03	0,152	0,568	0,053
Greece	2,294	0,405	0,12	0,044	0,017	0,102	0,081	0,145	0,076	0,154	0,075	0,196	0,772	0,105
Bulgaria	2,103	0,304	0,056	0,013	0,002	0,374	0,405	0,072	0,049	0,5	0,003	0,031	0,241	0,053
UKRAINE	2,020	0	0,075	0,164	0	0,37	0,173	0	0	0,423	0	0,036	0,779	0
Romania	1,507	0,228	0	0,025	0,002	0,456	0	0,085	0,049	0,231	0,015	0	0,363	0,053
Cyprus	1,454	0,354	0,001	0	0,021	0	0,173	0,013	0,288	0,058	0,063	0,045	0,017	0,421

* The numbers in the table label follow indicators:

1) integral coefficient of knowledge economy development; 2) number of Internet users (% of population, who used the Internet at least once a week); 3) number of researchers (per million of inhabitants); 4) R&D expenditures (%, share of GDP); 5) number of patent applications to the European Patent Office (per million of inhabitants); 6) employment in high-tech and medium-high-technology manufacture (% of total work force); 7) employment in high technology service (% of total workforce); 8) exports of high technology products as a share of manufacture product exports (%); 9) exports of high technology products as a share of total exports (%); 10) expenditures for information and communication technology (%,share of GDP); 11) R&D expenditures per capita (euro per capita); 12) share of researchers in total employment (%); 13) share of student in age group 20-29 years (%); 14) index of comparative advantage of export of high-tech products (the ratio of the share of high-tech exports in total exports of the country to this indicator for the EU).

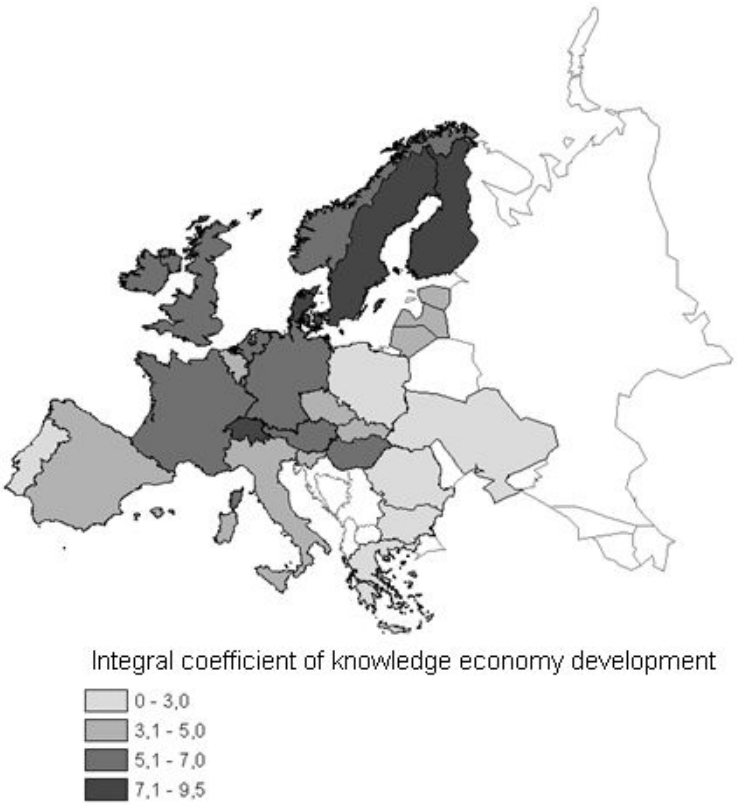

Figure 1 – Integral coefficient of knowledge economy development in Ukraine and EU countries

REFERENCES

1. Кулинич Р. О. Статистична оцінка чинників соціально-економічного розвитку : [монографія] / Р. О. Кулинич. – К. : Знання, 2007. – 311 с. 2. Федулова Л. І. Економіка знань / Л. І. Федулова : [підруч.] – К., 2009. – 600 с. 3. Чухно А. А. Постіндустріальна економіка: теорія, практика та їх значення для України / А. А. Чухно. – К. : Логос, 2003. – 631 с. 4. Cook P. Regional development in the knowledge-based economy: the construction of advantage / P. Cook, L. Leydesdorff // Journal of Technology Transfer. – 2006. – № 31. – P. 5-15. 5. Godin B. The knowledge-based Economy: Conceptual framework of Buzzword? / B. Godin // Journal of Technology Transfer. – 2006. – № 31. – P. 17-30. 6. Drucker P. From capitalism to knowledge society / P. Drucker // The knowledge economy. – Woburn : MA Butterworth, 1998. – P. 15-35. 7. Lundvall B.-A. National systems of innovation: towards a theory of innovation and interactive learning / B.-A. Lundvall. – London : Longman, 1992. – 342 p. 8. Machlup F. The production and distribution of knowledge in the United States / F. Machlup. – Princeton : Princeton University Press, 1962. – 416 p.