

COMPARATIVE ANALYSIS OF THE KNOWLEDGE-BASED POTENTIAL ON THE LEVEL OF COUNTRIES AND REGIONS

KRASNOKUTSKAYA N. S.

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Krasnokutskaya N. S. Comparative Analysis of the Knowledge-Based Potential on the Level of Countries and Regions

The article proposes the results of a comparative analysis of methodology for measuring the knowledge-based potential on the level of countries and regions. The features of the existing methods of constructing systems of knowledge-based indicators and indexes (Indicators of Information and Communication Technologies (ICT), ICT Development Index (IDI), Information Society Index (ISI), Networked Readiness Index (NRI), Knowledge Economy Indicators (KEI)) are distinguished. The scope of their application has been defined.

Key words: knowledge-based economy, potential, monitoring, indicators, indexes

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Krasnokutskaya Natalya S. – Doctor of Science (Economics), Associate Professor, Professor, Department of Trade and Catering Enterprises Economics, Kharkiv State University of Food Technology and Trade (vul. Klochkivska, 333, Kharkiv, 61051, Ukraine)

E-mail: krasnokutskaya.natalia@gmail.com

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Краснокутська Н. С. Порівняльний аналіз потенціалу, заснованого на знаннях, на рівні країн і регіонів

У статті представлені результати порівняльного аналізу підходів до виміру потенціалу, заснованого на знаннях, на рівні країн і регіонів. Виділено особливості та визначено сфери застосування існуючих методів побудови систем індикаторів і показників економіки знань: показників оцінки ступеня використання інформаційно-комунікаційних технологій (ICT), індексу розвитку інформаційно-комунікаційних технологій (IDI), індексу стану інформаційного суспільства (ISI), індексу мережної готовності (NRI), індексу економіки знань (KEI).

Ключові слова: економіка знань, потенціал, моніторинг, індикатори, індекси.

Табл.: 2. Бібл.: 11.

Краснокутська Наталія Станіславівна – доктор економічних наук, доцент, професор, кафедра економіки підприємств харчування та торгівлі, Харківський державний університет харчування та торгівлі (вул. Клочківська, 333, Харків, 61051, Україна)

E-mail: krasnokutskaya.natalia@gmail.com

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Краснокутская Н. С. Сравнительный анализ потенциала, основанного на знаниях, на уровне стран и регионов

В статье представлены результаты сравнительного анализа подходов к измерению потенциала, основанного на знаниях, на уровне стран и регионов. Выделены особенности и определены сферы применения различных методов построения систем индикаторов и показателей экономики знаний: показателей оценки степени использования информационно-коммуникационных технологий (ICT), индекса развития информационно-коммуникационных технологий (IDI), индекса состояния информационного общества (ISI), индекса сетевой готовности (NRI), индекса экономики знаний (KEI).

Ключевые слова: экономика знаний, потенциал, мониторинг, индикаторы, индексы.

Табл.: 2. Библ.: 11.

Краснокутская Наталья Станиславовна – доктор экономических наук, доцент, профессор, кафедра экономики предприятий питания и торговли, Харьковский государственный университет питания и торговли (ул. Клочкоивская, 333, Харьков, 61051, Украина)

E-mail: krasnokutskaya.natalia@gmail.com

Most governments declare the creation of dynamic and competitive knowledge-based economy as a priority area of economic development. Thereby, the intellectualization of the business becomes a modern trend in shaping the business environment, along with globalization and internationalization of the economy. The scope of these trends considerably varies geographically and by industries. Thus, the need for comprehensive comparative research of these trends and their dynamics arises. But one of the main problems is defining information society in any other way, measuring it in a different way with different variables and methods.

Recent investigations. Such studies are becoming the subject of scientific discussion in a wide range: in the framework of special programs of the World Bank [1], UNESCO Institute for Statistics [2], International Telecommunication Union of the UN [3], World Times publisher together with the consulting company IDC [4], some universities and research centers [5; 6].

The problem of measuring the knowledge-based potential comes from its significant differences from the traditional material resources. The knowledge-based potential [8; 9]:

- ✦ is unique and inexhaustible in the process of «consumption»;
- ✦ has low cost of reproduction;
- ✦ has complexity in costing;
- ✦ is accessible;
- ✦ increases its value with accumulation;
- ✦ makes possible the participation of knowledge consumer in the process of its creation;
- ✦ creates the possibility of receiving cognitive rent;
- ✦ increases profitability by its replication;
- ✦ needs participation of highly qualified staff in its creation and dissemination.

These features cause the fact that the indicators for measuring the knowledge-based potential are based on a few basic principles: transparency, comparability and ac-

cessibility for the calculations [10]. Most popular measuring techniques allow estimating the development of knowledge-based economy in countries and regions with a variety of indicators and composite indexes.

The *main purpose* of this article is to identify the features and applications of existing methods of constructing a system of indicators for the knowledge economy. Realization of this purpose necessitated the solution of the comparative analysis of approaches to measuring the knowledge-based potential on the level of countries and regions.

Approaches to monitoring system indicators are developed by Research Centre of the European Commission together with some universities in Germany, Belgium, the Netherlands and UNESCO Institute for Statistics. The recommended Indicators of Knowledge Economy (Knowledge Economy Indicators, KEI) are combined into five groups in accordance with the methodology of the European Commission [5]:

- 1) human resources (international mobility, knowledge-based industries, development of specific skills, etc.);
- 2) the effect on information and communication technology (number of suppliers and consumers, types of outsourcing in this area, the development of distance learning («E-learning»), etc.);
- 3) structural / organizational changes (changes in the responsibilities of staff, types of outsourcing, globalization of innovation, etc.);
- 4) entrepreneurship and «creative destruction» (loss of jobs, globalization of innovation, labor market flexibility, business and consumer demand, etc.);
- 5) changes in the production of knowledge (globalization and networking, the basis of intra-firm knowledge management, distance learning, social capital, etc.).

Due to the fact that some indicators in different groups are related (such as the development of distance learning, the types of outsourcing, globalization of innovation), their aggregation into a single category under KEI is not provided.

To monitor the information and knowledge society a Guide to Measuring Information and Communication Technologies (ICT) was proposed by UNESCO Institute for Statistics. All indicators are combined into four groups according to this technique [2]:

- 1) assessment of ICT as a generator of innovation and technological change (costs and revenues in R&D, the introduction of ICT in production, their use in innovation activity, etc.);
- 2) assessment of skills development of ICT staff involved in R&D (number of staff trained to work in the ICT, the number of students using computers, etc.);
- 3) assessment of ICT in science and technology (costs, staff, publications and patents in the field of ICT);
- 4) assessment of ICT use in research (the availability of computers and the Internet infrastructure at research centers and universities that specialize in R&D, availability of international electronic magazines, special research forums, etc.).

The indicators recommended by UNESCO, in contrast to the monitoring methodology KEI, reflect only the

information technology related aspects, and used to conduct the respected statistical researches.

The International Telecommunication Union of the UN has developed a similar in terms of focus recommendations, but on the aggregated index basis. This methodology is based on determining the index of information and communication technologies (ICT Development Index, IDI). It includes three groups of parameters [3]:

- 1) availability of ICT (the number of landline and cell phones per 100 inhabitants, households supply with computers and the Internet);
- 2) use of ICT (the number of Internet users, the number of mobile Internet users per 100 inhabitants, etc.);
- 3) development of ICT-skills (level of education of the adult population, population coverage ratio of secondary and post-secondary education).

Index IDI derives from an additive model of weighted average of its three components on a 10-point scale. It describes not only the degree of spreading and readiness to use ICT, but also allows to compare the gap between countries and to trace its change in dynamics.

Publishing World Times and IDC company developed in the 1990's their own method of measuring the ability of countries to «participate in the information revolution» using the Information Society Index (ISI) [4]. Set of indicators included in the ISI differs from the indicators monitoring by UNESCO and the indicators included in the IDI. The ISI is based on the assessments of the level of civil liberties, the number of press per capita and the freedom of the press. So the place in the information society ranks mostly correlates with the society: the higher the score from social factors the more possible for a country to be in a favorable place in the rank [11]. But, in contrast to previous methods, the main components in the ISI are the categories of computer, information, social, and Internet infrastructure. This approach mostly gives understanding of development of knowledge-based potential of the country from the prospective of national information potentialities and information capital.

A method for constructing the composite Networked Readiness Index (NRI) was developed by Harvard University in the framework of the World Economic Forum. The basis of its measurement consists of three sub-index [6]:

- 1) «the environment as a crucial factor in network readiness» (market, political, regulatory and infrastructure factors - the availability of venture capital, development of high-tech exports, development of legislation in the field of ICT, the level of postsecondary education);
- 2) «the readiness of key stakeholders to use ICT» (individual, business, government – the quality of education, providing schools with Internet, the existing telecommunications, the cost of mobile services, readiness to implement the IST in the operations and processes, cooperation with industry, education, etc.);
- 3) «the use of ICT» (individual, business, government – the number of mobile phones, personal computers, ISPs and Internet users, the ability to innovate, using the Internet for business, support for dissemination of ICT from the state, the development of quality e-government services, etc.).

The results give an opportunity to estimate the development of potential of information and communication technologies along with the degree of their penetration into other areas of the economy and quality of government efforts to promote the use of ICT. Therefore, the NRI has become one of the most important indicators to judge the country's potential and opportunities for its development.

World Bank's methodology provides the annual calculation of Knowledge Economy Index (KEI), which includes a system of indicators to monitor the readiness of the institutional environment for the transition to a model of knowledge-based development. KEI allows comparisons in the regional context and provides the construction of the aggregate indicator, which consists of four components [1, p. 3]:

- 1) economic incentive and institutional regime (EIR), which contribute to knowledge management and business development;
- 2) education and training, which are necessary for the creation, dissemination and use of knowledge;
- 3) innovation and technological adoption, which allow to develop global knowledge, adapt them to local needs and create on their basis of new technologies;
- 4) information and communications technologies (ICT) infrastructure, ensuring the effective dissemination and reproduction of information.

If the first component (EIR) allows estimating the readiness of the country (region) to the use of knowledge, the next three characterize its capacity to generate and share knowledge. Each component has the set of respective indica-

tors. Among the most important indicators are GDP growth, the quality of economic regulation, the level of secondary and post-secondary education, literacy, amount of research and patent applications per 1 million inhabitants, security of landlines and cell phones, computers, Internet accessibility and etc. With growth of indicators the potential of the country (region) on generating and using knowledge is increasing and the value of KEI, calculated as a simple average of four Components, approaches 10 (with 10-point scale).

The comparative analysis of all methodologies mentioned above can be done by their application in the regional context, the results of which are presented in *table 1*.

Comparison of countries on the basis of the different indexes allows establishing the fact of a significant gap between innovation-driven economies (G7 countries) and the transition from factor-driven for efficiency-driven economies (Ukraine, Russia). The largest gap is in the «network readiness» of countries due to the low coverage of network technology in business and public spheres. An elimination of this gap is an important priority in shaping government and companies' innovation policies.

Correlation analysis of the considered indexes (*table 2*) shows a high correlation ratio between them, which confirms the possibility of their application for monitoring of development of the knowledge-based potential by countries and regions.

CONCLUSIONS

Thus, the conducted research showed that most popular systems of indicators and composite indexes of development of the knowledge-based potential are using close

Table 1

Indexes of the knowledge economy across countries and regions in 2012*

Country	IDI		ISI		NRI		KEI	
	I	R(155)**	I	R(53)	I	R(142)	I	R(148)
<i>Eastern European and Baltic States</i>								
Poland	6,19	31	-	33	4,16	49	7,41	38
Latvia	6,06	36	-	-	4,35	41	7,41	37
Lithuania	6,06	35	-	-	4,66	31	7,80	32
Estonia	6,81	24	-	-	5,09	24	8,0	19
Ukraine	4,40	67	-	-	3,85	75	5,73	56
Russia	6,00	38	407	41	4,02	56	5,78	55
<i>G7 countries</i>								
United Kingdom	7,75	9	938	10	5,50	10	8,76	14
Germany	7,39	16	903	15	5,32	16	8,90	8
Italy	6,28	29	763	24	4,17	48	7,89	30
Canada	7,04	22	966	5	5,51	9	8,92	7
U.S.	7,48	15	993	3	5,56	8	8,77	12
France	7,30	18	842	19	5,12	23	8,21	24
Japan	7,76	8	833	18	5,25	18	8,28	22

* Compiled by the author based on [1; 3; 4; 6];

** I, R (155) – value of the index and ranking the country among 155 countries participating in the monitoring.

Coefficients of simple correlation between different indexes of development of the knowledge economy

Index	IDI	ISI	NRI	KEI
ICT Development Index (IDI)	1			
Information Society Index (ISI)	0,926	1		
Networked Readiness Index (NRI)	0,912	0,915	1	
Knowledge Economy Index (KEI)	0,970	0,992	0,939	1

source information. Moreover, they are all focused on identifying the gap between countries and regions. However, differences in the way of generalizing partial indicators can identify those aspects of economic development that require special attention and should be included in the monitoring facilities not only in the framework of international programs, but also within individual countries and regions. ■

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КЛАСИФІКАЦІЯ КРИЗОВИХ ЯВИЩ В ЕКОНОМІЦІ ТА МІСЦЕ В НИХ ПРОМИСЛОВИХ КРИЗ

ГРИЩЕНКО О. В., ПРОНОЗА П. В.

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Грищенко О. В., Проноза П. В. Класифікація кризових явищ в економіці та місце в них промислових криз

У статті розглядається сутність поняття «криза» та погляди науковців щодо класифікації кризових явищ в економіці. Запропоновано вдосконалену класифікацію криз за відповідними класифікаційними ознаками. Розглянуто сутність промислових криз і розроблено схему взаємозв'язку промислової кризи з іншими видами економічних криз.

Ключові слова: криза, кризові явища, промислова криза, класифікація, класифікаційна ознака.

Рис.: 1. **Табл.:** 3. **Бібл.:** 9.

Грищенко Олександр Володимирович – аспірант, Науково-дослідний центр індустріальних проблем розвитку НАН України (пл. Свободи, 5, Держпром, 7 під'їзд, 8 поверх, Харків, 61022, Україна)

Проноза Павло Володимирович – кандидат економічних наук, доцент, кафедра фінансів і кредиту, Харківський національний економічний університет (пр. Леніна, 9а, Харків, 61166, Україна)

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Грищенко А. В., Проноза П. В. Классификация кризисных явлений в экономике и место в них промышленных кризисов

В статье рассматривается сущность понятия «кризис» и взгляды ученых на классификацию кризисных явлений в экономике. Предложена усовершенствованная классификация кризисов по соответствующим классификационным признакам. Рассмотрена сущность промышленных кризисов и разработана схема взаимосвязи промышленного кризиса с другими видами экономических кризисов.

Ключевые слова: кризис, кризисные явления, промышленный кризис, классификация, классификационный признак.

Рис.: 1. **Табл.:** 3. **Библ.:** 9.

Грищенко Александр Владимирович – аспирант, Научно-исследовательский центр индустриальных проблем развития НАН Украины (пл. Свободы, 5, Госпром, 7 подъезд, 8 этаж, Харьков, 61022, Украина)

Проноза Павел Владимирович – кандидат экономических наук, доцент, кафедра финансов и кредита, Харьковский национальный экономический университет (пр. Ленина, 9а, Харьков, 61166, Украина)

Grishchenko A. V., Pronoza P. V. Classification of the Crisis Phenomena in Economy and a Place in them Industrial Crises

In article the essence of the concept «crisis» and views of scientists of classification of the crisis phenomena in economy is considered. Advanced classification of crises by the corresponding classification signs is offered. The essence of industrial crises is considered. The scheme of interrelation of industrial crisis with other types of economic crises is developed.

Key words: crisis, crisis phenomena, industrial crisis, classification, classification sign.

Pic.: 1. **Tabl.:** 3. **Bibl.:** 9.

Grishchenko Aleksandr V. – Postgraduate Student, Research Centre of Industrial Problems of Development of NAS of Ukraine (pl. Svobody, 5, Derzhprom, 7 pidyizd, 8 pov-erkh, 61022, Ukraine)

Pronoza Pavel V. – Candidate of Sciences (Economics), Associate Professor, Department of Finance and Credit, Kharkiv National University of Economics (pr. Lenina, 9a, Kharkiv, 61166, Ukraine)