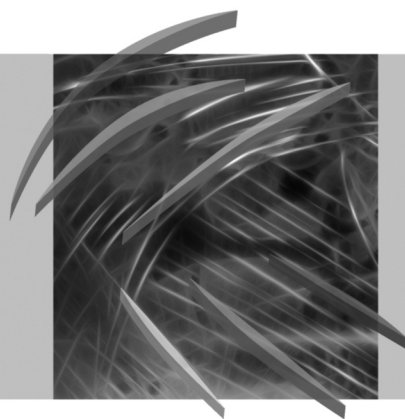


Advanced Information Technologies for Management – AITM 2011

Intelligent Technologies and Applications



edited by
**Jerzy Korczak, Helena Dudycz,
Mirosław Dyczkowski**



Reviewers: Frederic Andres, Witold Chmielarz, Jacek Cypryjański, Beata Czarnaacka-Chrobot,
Bernard F. Kubiak, Halina Kwaśnicka, Antoni Ligeza, Anna Ławrynowicz,
Mikołaj Morzy, Stanisław Stanek, Ewa Ziemia

Copy-editing: Agnieszka Flasińska

Layout: Barbara Łopusiewicz

Proof-reading: Marcin Orszulak

Typesetting: Adam Dębski

Cover design: Beata Dębska

This publication is available at www.ibuk.pl

Abstracts of published papers are available in the international database
The Central European Journal of Social Sciences and Humanities <http://cejsh.icm.edu.pl>
and in The Central and Eastern European Online Library www.ceeol.com

Information on submitting and reviewing papers is available on the Publishing House's website
www.wydawnictwo.ue.wroc.pl

All rights reserved. No part of this book may be reproduced in any form
or in any means without the prior written permission of the Publisher

© Copyright Wrocław University of Economics
Wrocław 2011

ISSN 1899-3192

ISBN 978-83-7695-182-9

The original version: printed

Printing: Printing House TOTEM

Contents

Preface	9
Witold Abramowicz, Jakub Dzikowski, Agata Filipowska, Monika Kaczmarek, Szymon Łazaruk , Towards the Semantic Web’s application for preparation of reviews – requirements and architecture for the needs of incentive-based semantic content creation.....	11
Frederic Andres, Rajkumar Kannan , Collective intelligence in financial knowledge management, Challenges in the information explosion era	22
Edyta Brzychczy, Karol Tajduś , Designing a knowledge base for an advisory system supporting mining works planning in hard coal mines ..	34
Helena Dudycz , Research on usability of visualization in searching economic information in topic maps based application for return on investment indicator	45
Dorota Dżega, Wiesław Pietruszkiewicz , AI-supported management of distributed processes: An investigation of learning process.....	59
Krzysztof Kania , Knowledge-based system for business-ICT alignment.....	68
Agnieszka Konys , Ontologies supporting the process of selection and evaluation of COTS software components	81
Jerzy Leyk , Frame technology applied in the domain of IT processes job control.....	96
Anna Ławrynowicz , Planning and scheduling in industrial cluster with combination of expert system and genetic algorithm.....	108
Krzysztof Michalak, Jerzy Korczak , Evolutionary graph mining in suspicious transaction detection	120
Celina M. Olszak, Ewa Ziemia , The determinants of knowledge-based economy development – the fundamental assumptions	130
Mieczysław L. Owoc, Paweł Weichbroth , A framework for Web Usage Mining based on Multi-Agent and Expert System An application to Web Server log files.....	139
Kazimierz Perechuda, Elżbieta Nawrocka, Wojciech Idzikowski , E-organizer as the modern dedicated coaching tool supporting knowledge diffusion in the beauty services sector	152
Witold Rekuć, Leopold Szczurowski , A case for using patterns to identify business processes in a company.....	164
Radosław Rudek , Single-processor scheduling problems with both learning and aging effects.....	173
Jadwiga Sobieska-Karpińska, Marcin Hernes , Multiattribute functional dependencies in Decision Support Systems	183

Zbigniew Twardowski, Jolanta Wartini-Twardowska, Stanisław Stanek, A Decision Support System based on the DDMCC paradigm for strategic management of capital groups	192
Ewa Ziemia, Celina M. Olszak, The determinants of knowledge-based economy development – ICT use in the Silesian enterprises	204
Paweł Ziemia, Mateusz Piwowski, Feature selection methods in data mining techniques	213

Streszczenia

Witold Abramowicz, Jakub Dzikowski, Agata Filipowska, Monika Kaczmarek, Szymon Łazaruk, Wykorzystanie mechanizmów sieci semantycznej do przygotowania i publikacji recenzji – wymagania i architektura aplikacji	21
Frederic Andres, Rajkumar Kannan, Inteligencja społeczności w finansowych systemach zarządzania wiedzą: wyzwania w dobie eksplozji informacji.....	33
Edyta Brzywczy, Karol Tajduś, Projektowanie bazy wiedzy na potrzeby systemu doradczego wspomagającego planowanie robót górniczych w kopalniach węgla kamiennego	44
Helena Dudycz, Badanie użyteczności wizualizacji w wyszukiwaniu informacji ekonomicznej w aplikacji mapy pojęć do analizy wskaźnika zwrotu z inwestycji	56
Dorota Dżega, Wiesław Pietruszkiewicz, Wsparcie zarządzania procesami rozproszonymi sztuczną inteligencją: analiza procesu zdalnego nauczania	67
Krzysztof Kania, Oparty na wiedzy system dopasowania biznes-IT	80
Agnieszka Konys, Ontologie wspomagające proces doboru i oceny składników oprogramowania COTS	95
Jerzy Leyk, Technologia ramek zastosowana do sterowania procesami wykonawczymi IT	107
Anna Ławrynowicz, Planowanie i harmonogramowanie w klastrze przemysłowym z kombinacją systemu eksperckiego i algorytmu genetycznego ..	119
Krzysztof Michałak, Jerzy Korczak, Ewolucyjne drażnienie grafów w wykrywaniu podejrzanych transakcji.....	129
Celina M. Olszak, Ewa Ziemia, Determinanty rozwoju gospodarki opartej na wiedzy – podstawowe założenia.....	138
Mieczysław L. Owoc, Paweł Weichbroth, Architektura wieloagentowego systemu ekspertowego w analizie użytkownika zasobów internetowych: zastosowanie do plików loga serwera WWW	151

Kazimierz Perechuda, Elżbieta Nawrocka, Wojciech Idzikowski, E-organizer jako nowoczesne narzędzie coachingu dedykowanego wspierającego dyfuzję wiedzy w sektorze usług kosmetycznych	163
Witold Rekuć, Leopold Szczurowski, Przypadek zastosowania wzorców do identyfikacji procesów biznesowych w przedsiębiorstwie	172
Radosław Rudek, Jednoprocesorowe problemy harmonogramowania z efektem uczenia i zużycia	181
Jadwiga Sobieska-Karpińska, Marcin Hernes, Wieloatrybutowe zależności funkcyjne w systemach wspomaganie decyzji	191
Zbigniew Twardowski, Jolanta Wartini-Twardowska, Stanisław Stanek, System wspomaganie decyzji oparty na paradygmacie DDMCC dla strategicznego zarządzania grupami kapitałowymi.....	203
Ewa Ziemia, Celina M. Olszak, Determinanty rozwoju gospodarki opartej na wiedzy – wykorzystanie ICT w śląskich przedsiębiorstwach	212
Paweł Ziemia, Mateusz Piwowarski, Metody selekcji cech w technikach <i>data mining</i>	223

Celina M. Olszak, Ewa Ziemba*

University of Economics in Katowice, Katowice, Poland

THE DETERMINANTS OF KNOWLEDGE-BASED ECONOMY DEVELOPMENT – THE FUNDAMENTAL ASSUMPTIONS

Abstract: The goal of this paper is to identify the most important determinants of the KBE development. A special attention was paid to: education and human competences, innovations, economic and institutional policies, and ICT (Information Communication Technology), as they have been regarded as a foundation for the knowledge-based economy. This paper is addressed to representatives of enterprises, administrations, universities, and other parties who intend to participate actively in the KBE development.

Keywords: knowledge-based economy, ICT, education, human competences, innovations.

1. Introduction

Interest in knowledge as a socio-economic development factor is not a new phenomenon. Knowledge has been a subject of numerous studies for a long time. It is commonly agreed that economic development has always been based (to smaller or bigger extent) on knowledge, and economic achievements are recorded by countries which invested in science, research and created favourable conditions for innovativeness. In the KBE, knowledge is of special importance. It plays more significant role than previous traditional factors, such as: land, labour, and capital. Knowledge has become the main factor of efficiency and economic growth, determining the competitiveness of particular enterprises [Kahin, Foray 2006; Leydesdorff 2006]. Attaining and processing information as well as creating new knowledge have developed into an important skill [Gabberty, Thomas 2007]. These competences are tightly linked with the utilization of various ICT, which create the bases for the development of innovative products and services [Hanna 2010a; Olszak, Ziemba 2008, 2010].

The KBE, as a traditional economy, can be described from a macro- and micro-economic perspective. In the first case, it means an economy which is characterised by the development of sectors connected with information processing, scientific de-

* e-mails: {celina.olszak,ewa.ziemba}@ue.katowice.pl.

velopment and branches of industry classified as high technology [*A New Economy?*... 2000]. It is an economy which is based directly on production, distribution and implementation of knowledge and information. In such an approach knowledge is understood as a product (a result of innovative operations) and a factor enhancing economic growth [Castells 1998; Conceição, Heitor, Lundvall 2003].

In the macroeconomic approach, the KBE is identified within an economy where the source of competitive advantage of enterprises lies in knowledge-intensive ventures. Competition comes down to quick generation of innovative ideas, referring not only to products and services, but also to business processes, organisational models and environment, where organisations operate [Tapscott, Williams 2006; Hamel, Breen 2007].

Founding a knowledge-based economy (KBE), in the opinion of many experts, is the only effective strategy to improve competitiveness of countries, regions and enterprises in the global market. However, the KBE construction requires primordial changes in the way of conducting economic, educational and innovation policies as well as in the manner of governing: companies, cities and whole regions. In such a situation, conducting complex and interdisciplinary studies becomes a must in order to understand determinants of the KBE development, obstacles to this development, and conditions for accelerating it.

As it is visible, both in the macro- and microeconomic approach, the KBE means not only an intensive use of ICT, but first of all changing power and labour relationships along with educational, organisational and cultural transformations [Kassicieh 2010]. Hands-on experience and analyses of the national and international literature, as well as analyses of reports and expert opinions, show that the KBE development is determined by the following factors [Olszak, Ziemia 2011]:

- development of education and improvement of human competences;
- strengthening of innovative potential;
- conducive economic and institutional policy;
- development and efficient use of ICT.

In the consecutive points of this paper the above mentioned determinants of the KBE development are characterised. Their synthetic analysis has been conducted in the Polish context. This paper is addressed to representatives of enterprises, public administration offices, universities and other players who intend to participate actively in the KBE development.

2. Development of education and improvement of human competences

Education and training processes are the main subjects of analysis and research in the field of KBE [Araya, Peters (Eds.) 2010]. It is so because knowledge and competence of employees determine innovativeness and competitiveness of enterprises,

regions and whole countries. Investment in the improvement of highly qualified staff has become a priority task. An appropriate educational system is indispensable in such a situation. Experience shows that the current way of education is inappropriate for new requirements and it needs to be redesigned. The present education is not flexible enough or oriented on knowledge reconstruction. It prefers acquiring procedural and theoretical knowledge. In addition, the current education does not address market and environmental needs sufficiently. In contrast, in the KBE the employees are expected to display creativity, competence, inter-disciplinarity, ability to cooperate in a multicultural environment, and ability to adjust quickly to fast-paced market changes. Consequently, employees often face the necessity to retrain, and change a job or profession. Life-long learning becomes indispensable. There is no such a thing as a life-long employment in the KBE, it often becomes informal, a period of employment interweaves with joblessness, retraining, etc.

In the KBE, the need for new professions and specialisations occurs, mainly referring to widely understood data transformation and ICT use [Tapscott, Williams 2006]. It becomes a main priority to enhance the relations of schools, universities especially, with their environment, business and ICT sector. Knowledge gained at the universities should be verified and refined in practical implementation. However, scientific research is often conducted in isolation from everyday practice and does not meet economic needs. Many a time it is fragmentary and not carried by inter-disciplinary teams.

Concerning the issue of educational development in the context of Polish conditions, it should be stated that it requires a fundamental redevelopment and cannot be a mere imitation of educational systems in other countries. Although much has been done recently (e.g. in the scope of improvement of educational level structure, especially among studying youth), Poland is still characterised by a low ratio of higher education in relation to the number of inhabitants. In the coming future it would be advisable to focus on the qualitative development, aiming at educating for the needs of new professions, creative thinking development and practical utilization of gained knowledge. Undoubtedly, the expenditure on education should be increased, as now it amounts to just 5% of GDP. Close cooperation of an educational sector with business is necessary as well as drawing up teaching curricula, where a special attention is paid to elasticity, team work, inter-disciplinarity, problem finding and solving, rather than the reproduction of the existing knowledge.

3. Strengthening of innovative potential

The further development of many countries, regions and companies will depend largely on the ability to innovate. It is necessary to create a system that will encourage an effective use of existing and creation of new knowledge as well as undertaking creative activity. Such a system should embrace research centres, universities, consulting companies, business and other organisations, which may reach out to

global knowledge resources, adopt this knowledge for local needs, and utilize it to create new knowledge and technologies [Llerena, Matt (Eds.) 2010].

The experience of countries, which achieved a success in the KBE development, proves that development of innovation is tightly connected with the role of a state. Help from a government may refer to following areas:

- supporting difficult innovative undertakings of a higher financial and organisational risk;
- creating appropriate legal and organisational support, enhancing innovation and its further implementation and commercialisation;
- creating a system of financial incentives for authors of technical and organisational innovations;
- promotion of innovative achievements in the economy.

The solutions implemented on a macro-scale shape the effectiveness of KBE on the microeconomic scale, which is firstly visible in creating conditions for development of innovative enterprises, therefore such enterprises are able to create, attain and absorb knowledge in order to generate: products, processes, organisational or managerial innovations as well as to adjust to the changes occurring in the environment. An important role in this respect is to be paid to management of particular companies. Also institutions such as: clusters, technological parks, entrepreneurship incubators, centres for technology and innovation transfer, and training-advisory centres should actively join the process of supporting and popularising entrepreneurship.

According to GUS (the Central Statistical Office) and EU research, the Polish innovativeness is in a poor condition and it is the weakest pillar of KBE [Adamowicz 2007; Grudzewski, Hejduk 2008]. It is indicated by a proportionally low contribution of research-and-development institutions in the process of new products and technologies creation. There are just a handful of Polish patents, utility models and know-how solutions used outside the country. In particular, the innovativeness of small and medium enterprises as well as of the market services sector is very low. In contrast to EU countries, the innovative activities of Polish enterprises are mainly based on purchases of new technologies. Polish innovativeness is visibly underfunded. The main source of financing of the R&D operations in Poland is the state budget. Foreign financing plays a minor role. Hence, there is a deep need for increasing investments in research and development. While in other countries R&D amounts to about 3% of GDP (3.7% in Finland), in Poland it is merely 0.7% of GDP.

Poland needs to work out a long-term national strategy for innovative system development. It is necessary to model a system which will allow for efficient dissemination of domestic as well as foreign knowledge. Chances for help in resolving these problems and implementing innovation are in international cooperation, participation in EU programmes, using various means for supporting regional development as well as in small and medium enterprises. The cooperation of all key participants

of an innovative process should be improved. These include universities, research institutions, design companies, and domestic and overseas enterprises.

4. Economic and institutional conditions

The KBE development requires a mature and long-term strategy on the public authorities side, and first of all deliberate economic policy of the government. These should enhance conditions favourable to the development of R&D, entrepreneurship and innovativeness among enterprises, strengthening legal property rights, etc. It turns out that obstacles in the KBE development are often of economic and institutional character. There is also a lack of coherent and effective state policy in this respect.

In Poland there are no economic instruments that would encourage companies towards implementation of entrepreneurship and innovativeness. Entrepreneurs have to face exceptionally complex and unstable legal regulations. In particular, the sector of small and medium enterprises (SME), which constitutes over 99% of all enterprises in the country, creates over a half of exports and nearly 60% of GDP as well as employs 65% of employees, is visibly neglected in the above respect. Polish SMEs clearly do not cope with the challenges of the KBE. A stable approach is missing even in the field of founding new enterprises. To compound the problem, even a fiscal policy is characterised by special restrictions as well as a high level of complexity and stringency. Another limitation in the operation of most of Polish companies is a deficiency of equity capital, which in turn leads to poor creditworthiness. In such a situation, self-financing is the basic source of funds for investment in many enterprises.

If the KBE is to develop in Poland, a reform of financial system and creation of strong and effective system of innovation implementation, along with the R&D promotion, are needed. It is absolutely necessary to increase the capital investment in work in the field of scientific research, development and implementation and to create financial incentives for authors of technical and organizational innovations. The state should support difficult innovative undertakings, especially those of a higher financial and implantation risk.

5. Development and efficient use of ICT

Many a time it has been proven that ICT infrastructure is of strategic importance to many countries, regions or enterprises. It is apparent that ICT:

- has a direct influence over the socio-economic development, contributing to the improvement of work effectiveness and lowering operating costs;
- creates new jobs, connected with a widely understood information/data processing;

- attracts investors and strategic partners as well as enhances attractiveness and reliability of particular regions;
- stimulates to setting up companies dealing with hard- and software;
- as a sector, is tightly connected with other related sectors which can develop more dynamically.

In Poland, general guidelines for ICT infrastructure functionality have been specified within the National Strategy Framework, stating that it is necessary to undertake the following steps [*Strategia kierunkowa...* 2005]:

- development of commonly accessible e-services in public administration, business and health care;
- stimulation of development and creation of Polish digital resources on the Internet, especially resources of vital importance for a competitive position of Polish economy in the EU, entrepreneurship development along with an increase of social and economic cohesion;
- development of ICT state infrastructure, particularly assuring common, broadband access to the Internet and services rendered electronically;
- development of skills indispensable in an active and creative participation in information society services, in particular adjustment of an educational system to the KBE needs.

As it has been often demonstrated, access to an ICT infrastructure is a necessary, although not sufficient, condition for an effective KBE development [Hanna 2009, 2010b; Heeks 2008; *Strategia rozwoju...* 2009]. Equally important are the following:

- raising awareness of ICT and the Internet potential possibilities among enterprises' employees and citizens;
- improving various digital skills;
- creating institutional and legal regulations for ICT development and implementation;
- involving the whole environment, especially local societies, in the development of various initiatives and projects on implementation and promotion of ICT structure; and
- continually monitoring the ICT infrastructure and its growth (e.g. launching new services).

Access to the Internet and various ICT facilitates the development of KBE. The Internet should be accessible for all citizens, both in their homes, places of work, and in public places (pubs, cafes, post offices, bus stops, surgery, culture centres, youth centres, shopping malls, etc.).

Building fast, broadband computer networks and assuring physical access to the Internet alone are not enough to provide full participation in the KBE. It is necessary to develop awareness and knowledge on possible ICT implementations. The issue of access to new technologies should not be pondered as to have or have not various equipment, but as to have particular skills. It is worth paying attention to the need

of running a promotional campaign of ICT as well as digital services and content among different people, also those who do not perceive themselves as ICT potential users [Stanley 2003]. It is also good to remember that gaining elementary digital skills cannot be entirely based on training courses, organized by formal educational and training institutions. Taking an advantage of informal networks (such as communities of learning) should be foreseen.

In order to build the KBE many indispensable economic, legal and other regulations are required. These should encourage citizens, enterprises and offices to set off for innovative undertakings, self-development, entrepreneurship, e-learning and learning various information technologies. In addition, an ICT infrastructure development for KBE requires constant monitoring and adjustment to the ever-changing economic and social needs as well as respecting the terms and conditions for interoperability. It is connected with the use of unified standards of data description, the rules for documentation exchange and data archiving (not only on the domestic but also international level). Interoperability lays foundations for unlimited information exchange within the global resources and running efficient communication [Kamal, Themisrocleous, Morabito 2008].

In comparison with other countries, the Polish ICT infrastructure is poorly developed. There are still patches on the map of Poland where access to the broadband Internet is hindered. The average number of reports on lack of access to the Internet from the whole country per 10,000 households amounts to 34.11. The Internet access costs are ones of the highest in Europe. The level of development of services, such as e-administration, e-healthcare and e-education, is unsatisfying. The use of e-signature is marginal. Investments connected with the e-business and e-commerce development are necessary. However, the on-line banking has been developing well, and it is used by 14 million of people. There are over eight million of active users, performing at least one operation a month. One and a half of Polish entrepreneurs use e-banking.

6. Conclusions

Closing the above considerations, it should be noted that the KBE development is a deeply contingent, of a holistic nature, economic, social, political, scientific, cultural and technological process. The KBE ought to be perceived from different angles simultaneously and its creation requires integrated, sometimes even syncretic, approach to its particular pillars. As the basic pillars, the following should be included:

- innovations (the existing knowledge effective diffusion and exploitation, exploitation of new knowledge, creation of product, process, marketing and organisational innovations),
- education (creates and transfers knowledge, builds the human capital capable of active participation in the KBE development, both on the part of its designers and beneficiaries),

- economic and institutional solutions (supplies stimuli and sets procedures for effective use of existing or creation of new knowledge as well as encourages entrepreneurship),
- ICT (allows for attaining, creating, governing, processing, transferring and often implementing knowledge).

The concept of KBE is often equated with such terms as: digital economy, network economy, e-economy. But this point of view is, in our opinion, rather dubious. We believe that ICT is one of the most important pillars of KBE.

The main beneficiaries of KBE are companies, and increasingly the use of ICT revolutionizes the way of conducting business. The analysis of the ICT use, especially the Internet in the Silesian enterprises, particularly in the context of KBE development, is presented in our next paper entitled “The determinant of knowledge-based economy development – ICT use in the Silesian enterprises”.

References

- A New Economy? The Changing Role Innovation and Information Technology in Growth* (2000), OECD, Paris.
- Adamowicz E. (2007), Wydatki na badania i rozwój a wzrost gospodarczy Unii Europejskiej na tle tendencji światowych, [in:] T. Kamińska, J. Fryc, B. Majecka (Eds.), *Efektywność gospodarki opartej na wiedzy. Teoria i praktyka*, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, pp. 57–70.
- Araya D., Peters M. (Eds.) (2010), *Education in the Creative Economy*, Peter Lang, New York.
- Castells M. (1998), *The Information Age: Economy, Society and Culture. The Rise of Network Society*, Vol. 3, Blackwell, Oxford.
- Conceição P., Heitor M.V., Lundvall B.A. (2003), *Innovation, Competence Building, and Social Cohesion in Europe – Towards a Learning Society*, Edgar Elgar, London.
- Gabberty J.W., Thomas J.D.E. (2007), Driving creativity: Extending knowledge management into the multinational corporation, *Interdisciplinary Journal of Information, Knowledge, and Management*, Vol. 2, pp. 1–13, <http://www.ijikm.org/Volume2/IJIKMv2p001-015Gabberty.pdf> (accessed: 15.10.2010).
- Grudzewski W.M., Hejduk I.K. (2008), *Zarządzanie technologiami. Zaawansowane technologie i wyzwania ich komercjalizacji*, Difin, Warszawa.
- Hamel G., Breen B. (2007), *The Future of Management*, Harvard Business School, Boston.
- Hanna N.K. (2009), *e-Transformation: Enabling New Development Strategies*, Springer, New York.
- Hanna N.K. (2010a), *Enabling Enterprise Transformation. Business and Grassroots Innovation for the Knowledge Economy*, Springer, New York.
- Hanna N.K. (2010b), *Transforming Government and Building the Information Society: Challenges and Opportunities for the Developing World*, Springer, New York.
- Heeks R. (2008). Benchmarking e-government: Improving the national and international measurement, evaluation and comparison of e-government, [in:] Z. Irani, P. Love (Eds.), *Evaluating Information Systems. Public and Private Sector*, Elsevier, New York, pp. 257–301.
- Kahin B., Foray D. (2006), *Advancing Knowledge and the Knowledge Economy*, Massachusetts Institute of Technology, Cambridge, MA.

- Kamal M.M., Themisrocleous M., Morabito V. (2008), Evaluating e-government infrastructure through enterprise application integration, [in:] Z. Irani, P. Love (Eds.), *Evaluating Information Systems. Public and Private Sector*, Elsevier, New York, pp. 302–321.
- Kassicieh S.K. (2010), The knowledge economy and entrepreneurial activities in technology-based economic development, *Journal of the Knowledge Economy*, Vol. 1, No. 1, pp. 24–47.
- Leydesdorff L. (2006), *The Knowledge-based Economy: Modeled, Measured, Simulated*, Universal Publishers, Boca Raton.
- Llerena P., Matt M. (Eds.) (2010), *Innovation Policy in a Knowledge-Based Economy: Theory and Practice*, Springer, Berlin.
- Olszak C.M., Ziemia E. (2008), A conceptual model of ICT for intellectual capital management, [in:] J. Korczak, H. Dudycz, M. Dyczkowski (Eds.), *Advanced Information Technologies for Management – AITM 2008*, Research Papers of Wrocław University of Economics No. 35, Publishing House of the Wrocław University of Economics, Wrocław, pp. 89–101.
- Olszak C.M., Ziemia E. (2010), Knowledge management curriculum development: Linking with real business needs, *Issues in Informing Science and Information Technology*, Vol. 7, pp. 235–248.
- Olszak C.M., Ziemia E. (2011), The use of ICT for economic development in Silesian Region in Poland, *Interdisciplinary Journal of Information, Knowledge, and Management*, Vol. 6, pp. 197–216.
- Stanley L.D. (2003), Beyond Access: Psychosocial Barriers to Computer Literacy, *The Information Society*, Vol. 19, pp. 407–416.
- Strategia kierunkowa rozwoju informatyzacji Polski do roku 2013 oraz perspektywiczna prognoza transformacji społeczeństwa informacyjnego do roku 2020* (2005), Ministerstwo Nauki i Informatyzacji, Warszawa.
- Strategia rozwoju społeczeństwa informacyjnego województwa śląskiego do roku 2015* (2009), Samorząd Województwa Śląskiego, Katowice.
- Tapscott D., Williams A.D. (2006), *Wikinomics: How Mass Collaboration Changes Everything*, Penguin Group, New York.

DETERMINANTY ROZWOJU GOSPODARKI OPARTEJ NA WIEDZY – PODSTAWOWE ZAŁOŻENIA

Streszczenie: Celem artykułu jest zdefiniowanie najważniejszych determinant rozwoju gospodarki opartej na wiedzy (KBE). Za kluczowe dla rozwoju KBE uznano: rozwój edukacji i doskonalenie kompetencji ludzi, wzmocnienie potencjału innowacyjności, politykę ekonomiczno-instytucjonalną oraz rozwój i racjonalne wykorzystanie technologii informacyjno-komunikacyjnej (ICT). Czynniki te zostały szczegółowo opisane i odniesione do sytuacji w Polsce. Artykuł jest adresowany do przedsiębiorstw, jednostek administracji publicznej, uczelni oraz innych jednostek, które powinny aktywnie uczestniczyć w rozwoju gospodarki opartej na wiedzy.

Słowa kluczowe: gospodarka oparta na wiedzy, ICT, edukacja, kompetencje ludzi, innowacje.