

THE DEVELOPMENT KNOWLEDGE-BASED ECONOMY: A LITERATURE REVIEW

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Abstract. *There is an increasing 'knowledge' component to economic activity. In a narrow sense this encompasses the growth of knowledge-intensive industries such as information technology, telecommunications and biotechnology. However, it is also becoming increasingly important in many other 'traditional' industries and there are indications that the knowledge content of work generally is increasing. The relevance of research is in the contribution of domestic economic science to building market relations, the sustainable and balanced development of the national economy in the face of global economic challenges, as well as the development of new scientific directions, concepts and models that are adequate to world trends and determine the construction of a "knowledge economy". The main idea of this research is to analyze the existing literature on research in the field of formation and development of a knowledge-based economy. In this paper, we examined in detail the existing literature related to the direction and depth of the development of a knowledge-based economy, indicating the most influential scientists, journals and relevant publications according to the most well-known Web of Science database. As the study of literary sources on the problems of the development of a knowledge-based economy shows, there is still no unequivocal opinion among researchers about its parameters and the depth of research. There are gaps that can be identified by analyzing existing literature. Knowledge economy is not just a new theoretical concept, but a new epoch, which has a fundamental difference from the era of the agrarian and industrial economy. Although its offensive appeared only in the early 90s, it already had an impact and caused changes in all spheres of economic and social life, and this influence is constantly growing. The trend of development of a Knowledge economy is the formation of a Knowledge economy, which will mean the onset of a new stage in the development of the global economy, namely, the stage of global economic networks. For Practitioners, this is valuable in that it is possible to determine the existing practice in the study of problems of development and development of a knowledge-based economy, as well as positive experience for the leaders of knowledge-based companies.*

Keywords: *knowledge-based economy, dimensions of knowledge-based economy, innovation management, literature review.*

Introduction

With the advent of the 21st century, information, communications, and computer technologies have undergone rapid innovation and popularization, profoundly altering human lifestyles and economic structures. The exploitation of asynchronous time in the virtual Internet environment, in tandem with transformations in electronic transactions and monetary regimes, has transformed conventional industrial production processes and management models. The “digital revolution” has triggered a “paradigm shift”, whereby the supply of production inputs, goods and services, covering every aspect of research and development, design, manufacturing, marketing, and transactions, has embodied a revolutionary change. As the fields of biochemistry, aerospace, materials science, and nanotechnology have experienced rapid successions of breakthroughs paced by the laboratories, so too have realms such as behavioral science undergone significant developments in theory and practical application through the interplay of information, communications, and computer technologies, unleashing vigorous entrepreneurial spirit and bringing it to bear on every facet of organizational operations.

Innovations in technical applications and know-how have introduced new game rules to markets, propelling a new wave of government regulatory measures including the regime of intellectual property rights and competition policy reforms. The knowledge-based economy has become the major trend in international society in the 21st century. Exploring the characteristics of the knowledge-based economy and establishing an appropriate economic paradigm for accelerating technological innovation is an urgent task for governments. Therefore, in a knowledge-based economic system, the issues concerned with the challenges and the adaptation of competition policy require profound discussion.

In the modern society in terms of globalization and technological revolutions the contemporary economy into a so-called "knowledge economy" (KE). This type of economy defined as an absolutely new type of organizations and work govern the world of business, demanding the rapid development of skills, solid knowledge and greater responsibility. In the research of Hadad (2017) modern civilization as a result converts to a learning society, adjusting to the innovative society, besides this meaning, educational systems should strive to form people who has opportunity to develop skills, to unite fully in the sociocultural background in which they live (Myburgh, 2011). From the middle of the last century, some arguments and disputes arose in the appropriate literature on modern society. In contradiction of this background, the first signs of a new society, a society based on education and knowledge, were discovered. Globalization has helped to more easily distribute new knowledge. Moreover, this was mainly due to modern technology. According to Hadad (2017) over the past years, four main concepts have been used in literature (Figure 1):

The first two main concepts are currently chosen by international organizations and influential politicians and will also be used in this document (Weber, 2011). However, this both words 'knowledge economy' illustrate the most important aspects of the whole concept: knowledge, the "driver of economic development" (Lin, 2006). In fact, the knowledge based economy develops constantly as a direct result of the important increase in knowledge in all economic processes and sectors of the economy (Davenport & Prusak, 2000; Movitz & Sandberg, 2009; Nonaka & Takeuchi, 1995; Rooney, 2005; Tchamyou, 2014; Viedma & Cabrita, 2012).

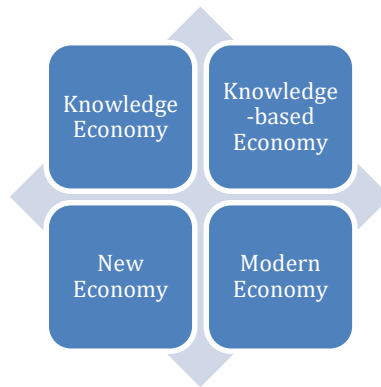


Figure 1. KE main concepts

A fundamental part in knowledge management is to spread and make knowledge accessible and usable within or between chosen organizations. When reviewing literature, there are some terms that seem more central and fundamental than others. For example, in the view of the knowledge-based firm creation, coordination, transfer, and integration of knowledge creates competitive advantages for firms. In addition to the statement above, proposes that knowledge transfer (KT) is a fundamental process of civilization and that it is central to learning which in turn is critical to development, there is clear support for exploring the term knowledge transfer.

It can be argued that in aiming for efficient knowledge-based economy, the search for “correct” choices of methods and steps is crucial. These choices require a well-defined taxonomy with clear concepts and terms. The content and meaning must be clear cut and there should be no ambiguity about the aim when fundamental concepts are used. Although this is undoubtedly a desirable objective, it is hardly the current state of affairs regarding commonly used terminology in knowledge-based economy. In many cases, the authors use central terms interchangeably and without making a distinction between them and sometimes without sufficient explanation of from which perspective the terms are used.

Clarifying the concept of “knowledge economy”

As the study of literary sources on the problems of the development of a knowledge-based economy shows, there is still no unanimous opinion among researchers on its quantitative and qualitative parameters. For example, in Blackler (1995); Bolisani and Bratianu (2017); Bratianu (2013); Asongu (2015) the following characteristic of a knowledge-based economy is given:

A knowledge-based economy is formed as a result of transformation into a diversified economy based on the production of high-tech products.

In a knowledge-based economy, the production of goods, works and services is based on information technologies that allow workers, firms and companies located in different parts of the country to communicate in real time using the Internet, personal computers, mobile communications and electronic commerce.

The system of relations between firms, companies, banks and other institutions is built in a knowledge-based economy on the exchange of computer digital codes (Bratianu & Bolisani, 2015).

The products of a knowledge-based economy are characterized by weightlessness due to miniaturization, the use of materials with predetermined properties. The products of a knowledge-based economy have inaccessible durability, durability, and efficiency. Such goods are distinguished by high labor intensity and added value. For example, the parameters of a knowledge-based economy are given in Alavi and Leidner (2001) where a knowledge-intensive economy is presented as a system in which products that change life, life and production do not have physical weight, in the sense of the physical mass.

According to Lu Yongxiang (1999), President of the Chinese Academy of Sciences, in a knowledge-based economy, the center for economic growth shifts to information technology, biotechnology, the creation of new materials and new sources of energy, as well as knowledge-intensive service industries such as advisory activities. "The high-tech economy," says Lu Yongxiang, "develops thanks to the knowledge and intellectual abilities of a person, so it is a form of economy that will apparently lead to the saving of resources, the coordinated interaction of man with nature and to sustainable development".

According to another point of view (Maximtseva, 2010), a knowledge-intensive economy is "... an economic system characterized primarily by the use of new technologies and discoveries in various areas of human activity, a large volume of already existing scientific knowledge, the generation of new knowledge, a high degree of motivation for the pursuit of innovation".

From the point of view of the Russian economist I.A. Maksimtseva (2010), the term "science-intensive economy" should be understood as an economic system characterized by the use of intellectual resources, new technologies and discoveries for the production of science-intensive products, the generation of new knowledge with a high degree of motivation for the pursuit of innovation. Also I.A. Maksimtseva (2010) considers incorrect the use of the concepts "knowledge economy", "information economy", "electronic economy", "network economy" used in the scientific literature as identical to the term "knowledge-intensive economy". These terms differ in content because each of them reflects the authors' point of view on the prevalence of this or that factor in production processes: in the "information" economy, the leading factor in production is information, the supporters of the "electronic" and "networked" economy are considered as constituting development of information and communication technologies, etc.

In the fair opinion of a number of scientists, in the science-intensive economy a special role is played by the creative, creative abilities of man. Melnikov (2010) told that a high-tech economy is an economy based on the creation and application of new knowledge about the world around, received by a person, his skills and skills in practice. As the main capital and resource of this stage of development of the economy is the intellect, the mind of man, embodied in his creative, creative actions Intellect in this case acts as a "basic" capital, and creative (or creative) actions, manifested through the creative energy of all market participants, are "negotiable" (sold or exchanged) capital.

Summarizing the analyzed literature, we believe that we should agree with researchers who consider the concepts of "information economy", "post-industrial economy", "new economy", "knowledge economy" and "knowledge-based economy", synonyms. In our opinion, they characterize identical transformational processes in the economy, based on the production of high-tech products, mainly based on the use of new scientific ideas, inventions, discoveries, and innovative technologies.

Literature review

The term knowledge-based economy, coined by the OECD in the 1990's, defined a type of economy which was "directly based on the production, distribution and use of knowledge and information" (OECD, 1996). At that time, it was hoped that the convergence of knowledge/ information and computer technology will become "the main driver of growth, wealth creation and employment across all industries" (APEC, 2000). Previous theoretical work by P. Drucker referred to the "knowledge society", a society in which the basic economic resources were no longer capital, natural resources and labor, but knowledge. Therefore, organizations were challenged to build systematic practices for managing self-transformation (Drucker, 1993). Economic analysts believed that knowledge can do more than increase economic growth; it can lead to structural economic and social change by affecting the volume of unemployment, the technological policy, the regulatory framework of a country's economy, the way work and production were organized (Soete, 1996), even the way life was lived (Neef, 1998). However, in 2001, the uneven rate of growth in several OECD economies was attributed not to knowledge production and distribution but to "information and communication technologies (ICT) (particularly investment in ICT), as well as to an increased use of quality labor and to the multifactor productivity growth arising in part from increased business innovation" (OECD, 2001).

There are two main economic theories that attempt to clarify the role of knowledge and technology in making sustained economic growth possible: the new growth theories and evolutionary theories. They have been developed when some economists have "perceived the limits to growth that finite resources and undesirable side effects would pose if no new recipes or ideas were discovered" (Romer, 1993). An economics of ideas as opposed to the economics of objects, which has been studied for centuries, has been proposed, in the hope that new ideas would increase a country's total stock of knowledge leading to sustained economic growth.

The new growth theories (also referred to as endogenous growth theories) consider (technological) knowledge a special type of commodity and use the standard neoclassical general equilibrium models to analyze the production, exchange and use of knowledge. The new growth theories highlight two main growth mechanisms: a) incremental learning and b) investments in R&D (innovation). The first is advocated among others by Lucas (1988, 1993). The second, pioneered by Romer (1986, 1990), Grossman and Helpman (1991), and Aghion and Howitt (1992), explains growth through the combined private and public aspects of investments in R&D. What provides the economic incentive for innovation is the partly "excludable" character of knowledge through the use of intellectual property rights (patents etc.). By exercising his/her intellectual property rights, the innovator, seen as a perfectly rational agent endowed with perfect information, may retain some of the rents accruing. Nonetheless, some of the new knowledge spills over to the rest of the economic system and increases the

social pool of public knowledge, which helps foster new innovations and hence allows growth to continue.

Attempts to empirically verify the new growth theories did not bring many results. Inferring from external R&D the internal productivity of firms and industries, Griliches (1992) measured some technology spillovers. A study by Jaffe and Trajtenberg (2002) identified knowledge flows and technological interaction by surveying patent data. Most new growth theorists find it difficult to treat knowledge as a good, albeit a special kind of good, because of the lack of analytical instruments:

If knowledge is indeed different from other goods, then it must be measured differently from other goods, and its relationship to the price system must be different from that of other goods. But the theoretical foundation on which national income accounting is based is one in which knowledge is fixed and common, where only prices and quantities of commodities need to be measured (Howitt, 1996, p. 10).

Evolutionary economic theories (also referred to as system theories) encompass a number of streams of thought all based originally on Schumpeter's logic of "creative destruction" (Schumpeter, 1934). The main idea in these theories is the perception that innovation, and the technological and organizational changes associated with it, are the key drivers of long-run economic growth (Bryant & Wells, 1998).

The knowledge-based economy should aim higher than the mere amassment of technological knowledge of how to subdue reality to the wishes of men in the hope that this will make societies wealthier and happier. It should deepen the knowledge of humans as they are moral warts and all. The missing moral dimension of knowledge must be cultivated (Sabau, 2006) through recovery of a body of ideas that informs the moral order of classical liberalism, an order which emphasizes freedom within the limits of physical and institutional (legal and ethical) constraints and impartial justice rooted in the moral equivalence of persons. This "thick" morality of a self not abstracted from communal values and commitments (MacIntyre, 1981) offers a better normative stance for the promotion of sustainable development.

Methodology

To analyze and solve the research problem, we reviewed the literature with three databases. First of all, we reviewed the most famous and large databases: Google Scholar, SCOPUS and Thomson ISI Web of Knowledge. The public Google Scholar over the Internet was rejected as part of our study. Because according to (Harzing and Wal, 2008). We cannot consider Google Scholar as a lack of analytical tools of citation information (Li et al., 2010) also Google Scholar demonstrated insufficient knowledge and understanding of the main issues of citation indexing. On the other hand, P. Jacso (2005) compared the three famous datasets, Scopus, Web of Science and Google Scholar, on different grounds and bring into being that the last one demonstrated insufficient knowledge and understanding of the main issues of citation indexing.

Meanwhile Boyle and Sherman (2006) indicated that has the oldest database, it has strong coverage with citation data and bibliographic data which goes back to 1900. WOS claims as it has the most depth and the biggest database with the wide range of records.

Findings

Firstly, we focused on total quotes of documents. In the Figure 3 we can find the chronological segmentation of the papers using three categories: 18443 in general and 7543 in “Management”, “Economics” and “Business” category of publications.

All data was collected from WOS database on the current date 17 of February 2018. First, we gathered 25,097 documents by searching in “Topic” field the words “knowledge economy”. Further we considered 18443 publications in our data set, which is designated as a “general” category. The extracted publication types include articles, proceedings papers, books reviews, editorial materials and others (Figure 1).

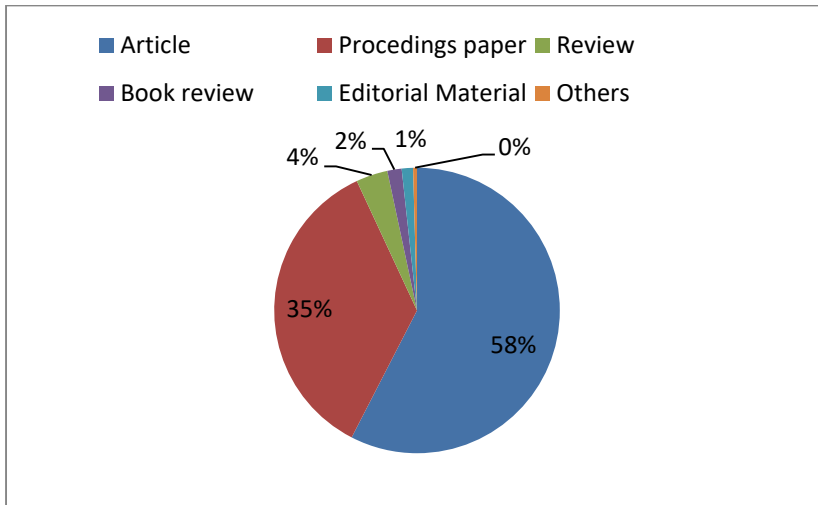


Figure 1. Observing general category by publications by types

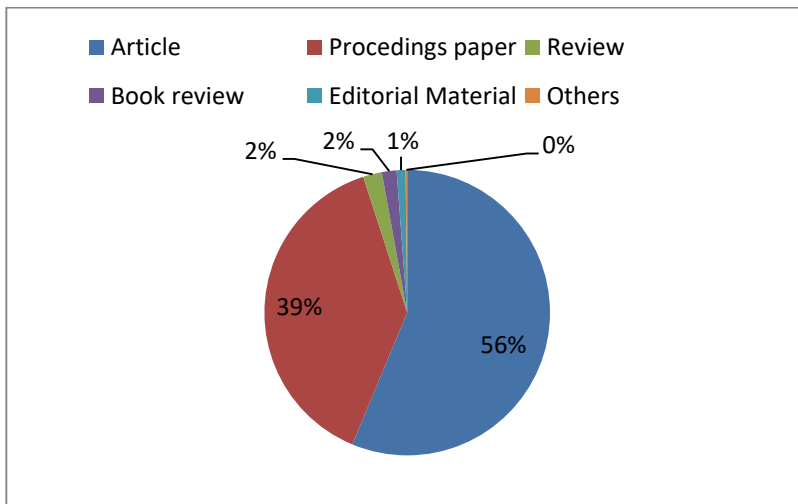


Figure 2. Segmentation of “Management”, “Economics” and “Business” category documents by types of publication

In the second stage of our research include more deep analysis to the specific subject are "Management", "Economics" and "Business". As a result, there were found 7543 documents (Figure 2). In more detail publications were analyzed using authors' bibliographic information, years of publication, content coverage, counties, journal names and citation frequency

According to Figure 3 the earliest article studied knowledge economy was published in 1977. However, there was insignificantly number of publications until 1991 (not more than 10 per year in both categories). In 1992 - 1997 the amount of publications increased in both "general" (from 22 to 126 respectively), although "Management", "Economics" and "Business" still has half of "general" publications in a year. Amount of publications in "general" overcome 1000 only in 2009. For example, there were 1053 publications for 2009, 1206 for 2012 and 2078 for 2016. The same taps can be considered to the "Management", "Economics" and "Business": 128 for 2001, 513 for 2010 and 797 for 2016. For 2018, the data given only for two months (January to February).

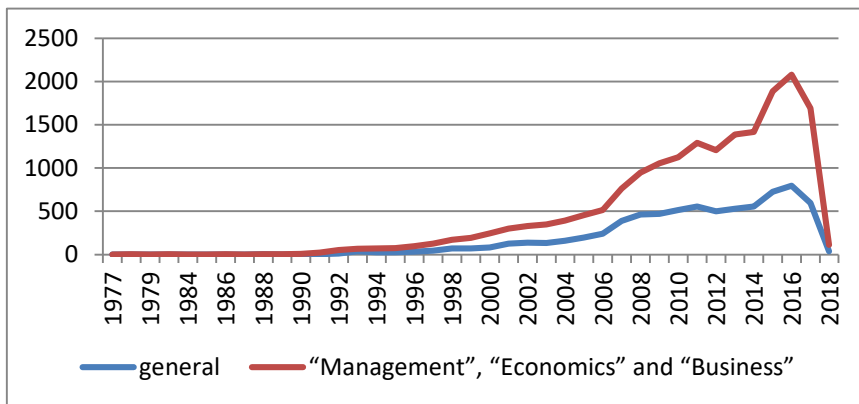


Figure 3. Number of publications per year.

Web of Science has 252 subject areas clusters in publications. We took only 18 subject areas with more than 500 publications (Figure 4). Consequently, the mainstream of publications in "Management" (3874 papers), "Economics" (3456 papers) and "Business"(2753 papers) were related to the field of "Education educational research".1718 publications, "Environmental studies" - 1122, to "Geography" - 1120, "Planning development" - 1111, "Computer science Information systems" - 943, "Operations research Management science" - 910, "Social science Interdisciplinary" - 785, "Information science Library science" - 712, and "Environmental science" - 657. Other fields like "Engineering electrical electronic" (605) and "Computer science Interdisciplinary applications" (598) have fewer publications than those mentioned above. "Management", "Economics" and "Business" has 10083 publications, where Procedia Social and Behavioral Sciences Journal 177 publications, European Planning Studies and Research Policy - 114 and 131 respectively. These figures confirm our assertion that studies related to the knowledge economy from the managerial and economic approach are not sufficiently developed.

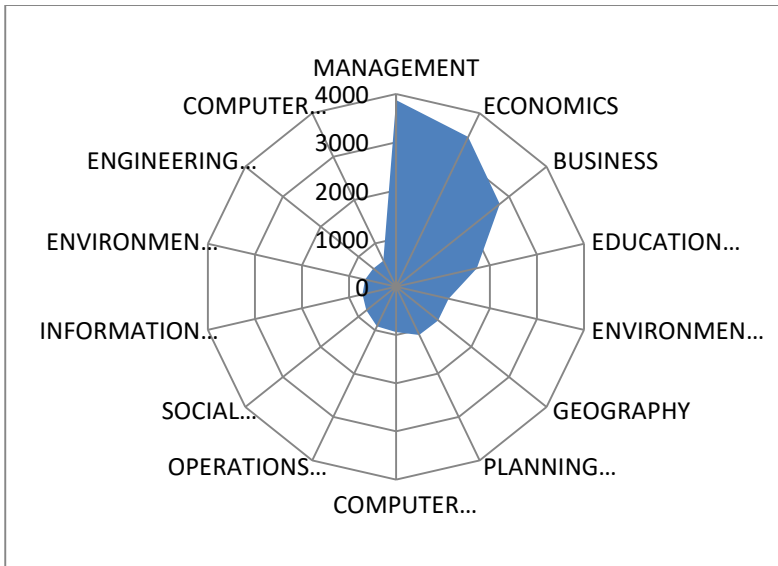


Figure 4. Segmentation of publications by clusters

Further, we confined publications to “articles”, in the “general” category there were 7545 articles among 18443 documents. Analysis recognized that the most citable document was written by M.E. Porter (1998) and published in *Harvard Business Review*. After that we choose articles with at least 500 citations in total. As mentioned earlier the first paper appeared in the Dataset written by G.P. Sweeney in the *Information Scientist* in 1977. Four articles among these 15 papers have more than 500 total citations. By analysis of annotations of 15 articles, we found that 2-ranked paper and 14-ranked paper are specifically dedicated to knowledge economy, whilst others have geography and environment. This paper was published in *Progress in Human Geography* and *environment and Planning A* journals. In addition, we calculated the annual quotes for each article that showed that the annual quotes of articles rise accordingly with a large number of cites.

Table 1. Articles with the quotes of citations more than 500 citations in “general” category

No	Cites	Author(s)	Title of Paper	Publication name	Publication year	Cites per year
1	1990	Porter, ME	Clusters and the new economics of competition	Harvard Business Review	1998	94.76
2	1465	Bathelt, H; Malmberg, A; Maskell, P	Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation	Progress in Human Geography	2004	97.6
3	1207	Porter, ME	Location, competition, and economic development: Local clusters in a global economy	Economic Development Quarterly	2000	63.53

Nº	Cites	Author(s)	Title of Paper	Publication name	Publication year	Cites per year
4	1088	Kale, P; Singh, H; Perlmutter, H	Learning and protection of proprietary assets in strategic alliances: Building relational capital	Strategic Management Journal	2000	57.26
5	950	Teece, DJ	Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets	California Management Review	1998	45.24
6	845	Maskell, P; Malmberg, A	Localized learning and industrial competitiveness	Cambridge Journal of Economics	1999	42.25
7	759	Owen-Smith, J; Powell, WW	Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community	Organization Science	2004	50.60
8	737	Javorcik, BS	Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages	American Economic Review	2004	49.13
9	645	HEDLUND, G	A model of knowledge management and the n-form corporation	Strategic Management Journal	1994	25.80
10	617	Verrecchia, RE	Essays on disclosure	Journal of Accounting & Economics	2001	34.28
11	608	Malmberg, A; Maskell, P	The elusive concept of localization economies: towards a knowledge-based theory of spatial clustering	Environment and Planning A: Economy and Space	2002	35.76
12	600	Furman, JL; Porter, ME; Stern, S	The determinants of national innovative capacity	Research Policy	2002	35.29
13	595	Frenken, Koen; van Oort, Frank; Verburg, Thijs	Relate variety, unrelated variety and regional economic growth	Regional Studies	2007	49.58
14	504	Coe, NM; Hess, M; Yeung, HWC; others.	'Globalizing' regional development: a global production networks perspective	Transactions of the Institute of British Geographers	2004	33.60
15	503	Henderson, R; Cockburn, I	Scale, scope, and spillovers: The determinants of research productivity in drug discovery	Rand Journal of Economics	1996	21.87

The same research was made to the limited groups – “Management”, “Economics” and “Business” (Table 2). We analyzed only papers with the type of article. So we collected 4358 articles among 7545 all documents. We designated 11 articles with more than 500 total citations. In these fields also the paper of M.E. Porter (1998) published in Harvard Business Review reached the most amounts of citations (1990 citations). Undoubtedly, our expectations were justified; the key areas of research in these journals are related to problems of business, management and economics. Two of the most cited articles were written by M.E. Porter.

Table 2. “Management”, “Economics” and “Business” articles with the highest number of citations

No	Publication year	Author(s)	Title of Paper	Publication name	Cites	Cites per year
1	1998	Porter, ME	Clusters and the new economics of competition	Harvard Business Review	1990	94.76
2	2000	Porter, ME	Location, competition, and economic development: Local clusters in a global economy	Economic Development Quarterly	1207	63.53
3	2000	Kale, P; Singh, H; Perlmutter, H	Learning and protection of proprietary assets in strategic alliances: Building relational capital	Strategic Management Journal	1088	57.26
4	1998	Teece, DJ	Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets	California Management Review	950	45.24
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11	2007	Frenken, Koen; van Oort, Frank; Verburg, Thijs	Relate variety, unrelated variety and regional economic growth	Regional Studies	595	49.58
12	1996	Henderson, R; Cockburn, I	Scale, scope, and spillovers: The determinants of research productivity in drug discovery	Rand Journal of Economics	503	21.87

In the next level of our research, we identified the countries with the largest number of articles devoted to the topic of knowledge economy. According to the "general" category the most papers published in the US, China and England (Figure 5). Meanwhile, outline is the same for "Management", "Economics" and "Business" category: leaders are the US, China and England. In Figure 5 we can find that a lot of countries study the problems of the formation of a knowledge-based economy, however developing countries consider knowledge economy in the prism of economic field. Kazakhstan also pays attention to this field of study.

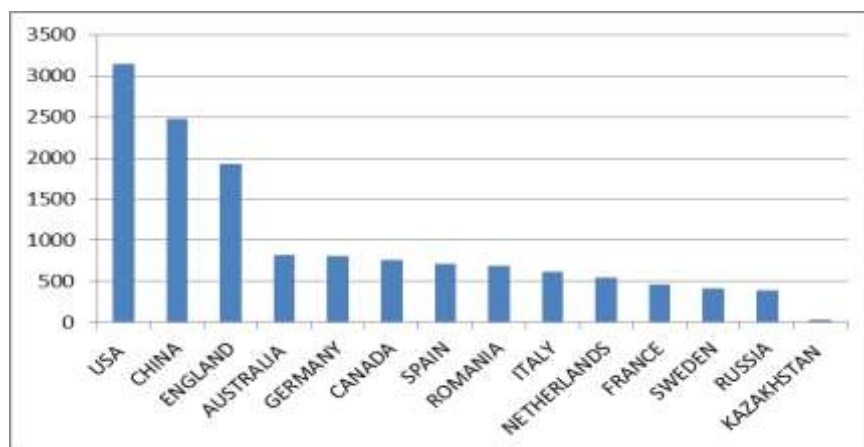


Figure 5. Articles sorted by countries in the "General" category

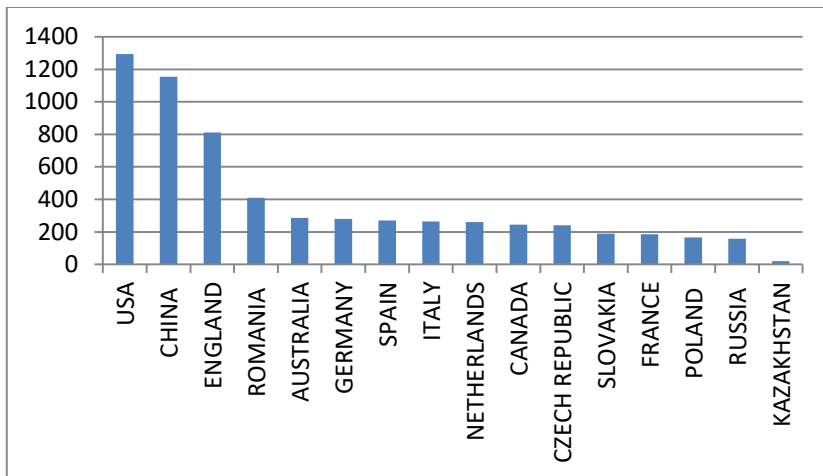


Figure 6. Articles sorted by countries in the “Management”, “Economics” and “Business” categories

In the last stage of our research, we chosen 15 journals which have 60 or more articles devoted to problems of knowledge economy (Table 3). Altogether, these journals published 916 publications or 21 % of all “general” articles. Procedia Social and Behavioral Sciences with 182 papers (12%) stands out, followed by European Planning Studies with 131 papers (9%). Six journals have published more than 100 papers.

Table 3. Journals which have 60 or more articles devoted to problems of knowledge economy

Rank	Journal Title	Number of papers	Percentage of total (%)
1	Procedia Social and Behavioral Sciences	182	12%
2	European Planning Studies	131	9%
3	Regional Studies	122	8%
4	Edulearn Proceedings	116	8%
5	Research Policy	114	8%
6	Advances in Social Science Education and Humanities Research	113	8%
7	Inted Proceedings	95	6%
8	Technological Forecasting and Social Change	93	6%
9	Environment and Planning	82	6%
10	International Journal of Technology Management	80	5%
11	Proceedings of the European Conference on Knowledge Management	76	5%
12	Advances in Education Research	70	5%
13	Urban Studies	68	5%
14	Ekonomicky Casopis	65	4%
15	Journal of Cleaner Production	65	4%
	Total	1472	

We analyzed journals in “Management”, “Economics” and “Business” categories and selected 15 journals with at least 30 publications studied the topic. The data you can see in the Table 4). These 15 journals published articles related to the knowledge economy in total 916 articles.

Table 4. Journals which have more than 30 papers related to knowledge economy in the “Management”, “Economics” and “Business categories

Rank	Journal Title	Number of papers	Percentage of total (%)
1	Regional Studies	109	12%
2	Research Policy	109	12%
3	Technological Forecasting and Social Change	88	10%
4	International Journal of Technology Management	78	9%
5	Ekonomicky Casopis	60	7%
6	Technovation	59	6%
7	International Business Review	58	6%
8	Journal of Economic Geography	55	6%
9	Journal of Business Research	53	6%
10	Journal of International Business Studies	51	6%
11	Annals of Regional Science	46	5%
12	Journal of the Knowledge Economy	44	5%
13	Tijdschrift voor Economische en Sociale Geografie	38	4%
14	African Journal of Business Management	34	4%
15	Management Decision	34	4%
	Total	916	

Data given in the Table 4 shows that the three journals which published the highest amount of publications related to the topic are Regional Studies Journal with 109 papers (12%), Research Policy with 109 papers too (12%) and Technological Forecasting and Social Change with 88 papers (10%) and International Journal of Technology Management with 78 papers (9%). Other journals have less than 60 articles. Substantially that research interests of these journals are related to managerial science, which is close to the knowledge economy.

Summary

A knowledge-based economy is formed as a result of transformation into a diversified economy based on the production of high-tech products. A high-tech economy is not oriented towards consumption on a large scale of natural resources, but on a wider application. It is distinguished by the consumption on a large scale of new scientific knowledge, inventions, discoveries, new progressive technologies.

The relevance of growing information in studying knowledge economy shows the total number of articles in “general” category is 18443 and by analyzing chronological issue of papers, we can conclude that this topic became popular since 2000s. However, every year, the number of publications devoted to this topic is growing, as well as the number of citations of already available publications. Moreover, it should also be noted that interest in this area comes not only from economists and managers as well as researchers of other fields of knowledge.

It is noted that the most influential articles were published in countries such as the USA, China, and the United Kingdom. According this, our analysis showed that it is unlikely that any institution has clearly focused on researching the problems of the economy of the economy.

Journals like *Regional Studies*, *Research Policy*, *Technological Forecasting and Social Change*, *International Journal of Technology Management* can be useful for scholars who study knowledge economy.

The core value of the knowledge-based economy lies in “innovation.” The momentum behind innovation arises from “competition.” Furthermore, “fairness” and the “legal system” are the foundations of efficiency and healthy competition. Therefore, the substantial promotion of the Competition Act is the cornerstone of technological innovation and the development of the knowledge-based economy. The knowledge-based economy has become the major trend in global development in the 21st century. The digital revolution has resulted in a de-emphasis on the production processes and management patterns of traditional businesses, while knowledge-based enterprises using new business methods and models have prospered. Furthermore, the concepts of merchandisers, services, enterprises, consumers, supply, demand, transactions, price, and market scope are becoming more blurred. The well-behaved demand function and the law of diminishing returns to scale of traditional economies and the static productive efficiency from the supply side can no longer satisfy the need for a dynamic optimal allocation of resources. The positive feedback loop brought about by the network effect and characterized by the phenomenon of increasing returns to scale indicates that dynamic competition is more salient than ever before. Likewise, in this age of the knowledge-based economy, competition policy is contributing significantly to a country’s development on a long-term basis.

In addition, in this age of the knowledge-based economy, as key knowledge appears everywhere, market competition is becoming more severe than ever before. As consumers enjoy the fruits of a knowledge-based economy, they also take risks based on asymmetrical and incomplete information. These are all reasons why the competition law authorities get involved in the market. Even if the products, businesses, and technology in this age of the knowledge-based economy keep on being innovated, and the conditions related to market competition drastically differ from those of the past, the Competition Act’s principle of safeguarding fair trade and maintaining fair competition remains unchanged. Even more, it should be intensified because the results of restrictions on competition and technological innovation in a knowledge based economy are more serious than before, and have a widespread impact. In this age of the knowledge-based economy that calls for innovation and change, all merchandise can take on a new value through innovation. All businesses can increase their productivity by means of knowledge. If we can consolidate the execution of this competition policy,

and create a quality environment in which there is fair competition, this can help enhance competition and develop the market mechanism, thus causing economic resources to be allocated more reasonably and efficiently. Moreover, by doing this we can also encourage further technological innovation in business, thereby intensifying the development of economic vitality, and achieving sustainable stability and social prosperity.

Knowledge economy is not just a new theoretical concept, but a new epoch, which has a fundamental difference from the era of the agrarian and industrial economy (Valdez etc., 2016). Although its offensive appeared only in the early 90s, it already had an impact and caused changes in all spheres of economic and social life, and this influence is constantly growing. The trend of development of a Knowledge economy is the formation of a Knowledge economy, which will mean the onset of a new stage in the development of the global economy, namely, the stage of global economic networks.

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References

- Aghion, H., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica*, 60, 323–351.
- Alavi, M., & Leidner, D.E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107–136.
- APEC (2000). Towards Knowledge-Based Economies in APEC, APEC Secretariat, Singapore. Retrieved from <http://www.apecsec.org.sg> (accessed March 24, 2006).
- Asongu, S.A., & De Moor, L., (2015). Financial globalisation dynamic thresholds for financial development: evidence from Africa. African Governance and Development Institute Working Paper No. 15/040, Yaoundé.
- Bejinaru, R. (2017). Universities in the knowledge economy. *Management Dynamics in the Knowledge Economy*, 5(2), 251-271.
- Blackler, F. (1995). Knowledge, knowledge work and organizations: an overview and interpretation. *Organization Studies*, 16(6), 1021–1046.
- Bolisani, E., & Bratianu, C. (2017). Knowledge strategy planning: an integrated approach to manage uncertainty, turbulence, and dynamics. *Journal of Knowledge Management*, 21(2), 233-253.
- Boyle, F., & Sherman, D. (2006). Scopus: The product and its development. *The Serials Librarian*, 49(3), 147-153.
- Bratianu, C. (2013). The triple helix of the organizational knowledge. *Management Dynamics in the Knowledge Economy*, 1(2), 207-220.
- Bratianu, C., & Bolisani, E. (2015). Knowledge strategy: An integrated approach for managing uncertainty. In Massaro, M. & Garlatti, A. (eds.). *Proceedings of the 16th European Conference on Knowledge Management, University of Udine, Italy, 3-4 September 2015* (pp.169-177). Reading: Academic Conferences and International Publishing.

- Bryant, K., & Wells, A. (1998). A new school of thought. In Bryant, K., & Wells, A. (eds.), *A New Economic Paradigm? Innovation-based Evolutionary Systems*. Canberra: Department of Industry, Science and Resources.
- Davenport, H.T., & Prusak, L. (2000). *Working knowledge. How organizations manage what they know*. Boston: Harvard Business School Press.
- Drucker, P. (1993). *Post-capitalist society*. Oxford: Butterworth-Heinemann.
- Griliches, Z. (1992). The search for R&D spillovers. *Scandinavian Journal of Economics*, 94, 29–48
- Grossman, G., & Helpman, E. (1991). *Innovation and growth in the global economy*. Cambridge: MIT Press.
- Harzing, A.W.K., & Wal, R. van der (2008). Google Scholar as a new source for citation analysis?. *Ethics in Science and Environmental Politics*, 8, 62-71.
- Hadad, Sh. (2017). Knowledge Economy: Characteristics and Dimensions. *Management Dynamics in the Knowledge Economy*, 5(2), 203-225.
- Howitt, P. (1996). On some problems in measuring knowledge-based growth. In Howitt, P. (ed.), *The Implications of Knowledge-Based Growth for Micro-Economic Policies*. Calgary: The University of Calgary Press.
- Jacso, P. (2005). As we may search – Comparison of major features of the Web of Science, Scopus, and Google Scholar citation-based and citation-enhanced databases. *Current Science*, 89(9), 1537-1547.
- Jaffe, A.B., & Trajtenberg, M. (2002). *Patents, citations and innovations. A window on the knowledge economy*. Cambridge: MIT Press.
- Li, J., Burham, F., Lemley, T., & Britton, M. (2010). Citation Analysis: Comparison of Web of Science1, Scopus, SciFinder, and Google Scholar. *Journal of Electronic Resources in Medical Libraries*, 7, 196–217.
- Lin, B., (2006). A sustainable perspective on the knowledge economy: A critique of Austrian and mainstream view. *Ecological Economics*, 60(1), 324-332.
- Lu Yongxiang (1999). The era of knowledge-based economy and the development of science and technology / Yongxiang Lu [Electronic resource], 1999. Retrieved from <http://www-sbras.nsc.ru/HBC/1999/n31/fhtml>. (accessed 30/09/2015)
- MacIntyre, A.C. (1981). *After virtue: a study in moral theory*. London: Duckworth.
- Maksimtseva, I.A. (2010). *Fundamentals of a knowledge-based economy (Knowledge, Creativity, Innovation)*, Moscow: Creative Economy.
- Melnikov, O.N. (2010). *Management of intellectual-creative resources of high-tech industries*. Moscow: Creative Economy.
- Movitz, F., & Sandberg, A. (2009). The organisation of creativity: content, contracts and control in Swedish interactive media production. In McKinlay, A., & Smith, C. (eds.) *Creative Labour*. London: Palgrave Macmillan.
- Myburgh, A.F. (2011). Legal developments in the protection of plant-related traditional knowledge: An intellectual property lawyer's perspective of the international and South African legal framework. *South African Journal of Botany*, 77, 844-849.
- Neef, D. (1998). The knowledge economy: an introduction. In Neef, D. (ed.), *The Knowledge Economy*. Boston, MA: Butterworth-Heinemann.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company. How Japanese companies create the dynamics of innovation*. Oxford: Oxford University Press.
- OECD (1996). *The knowledge-based economy*. Paris: OECD.
- OECD (2001). *The New Economy: Beyond the Hype, Final Report on the OECD Growth Project, Executive Summary*. Paris: OECD.
- Romer, P.M. (1993). Economic growth. In Henderson, D.R. (ed.), *The Fortune Encyclopedia of Economics*. New York, NY: Time Warner.

- Rooney, D. (2005). Knowledge, economy, technology and society: The politics of discourse. *Telematics and Informatics*, 22, 405-422.
- Sabau, G. (2001). *Societatea cunoasterii. O perspectiva romaneasca* [The knowledge society. A Romanian perspective]. Bucharest: Economica Publishing House.
- Sabau, G. (2010). Know, live and let live: Towards a redefinition of the knowledge-based economy — sustainable development nexus. *Ecological Economics*, 69, 1193–1201.
- Schumpeter, J. (1934). *The theory of economic development*. Cambridge, MA: Harvard University Press.
- Soete, L. (1996). Economic and social implications of a knowledge-based society. In Howitt, P. (ed.), *The Implications of Knowledge-Based Growth for Micro-Economic Policies*. Calgary: The University of Calgary Press.
- Tchamyou, S.V. (2014). The role of Knowledge Economy in African Business. HECManagement School, University of Liege.
- Valdez Luis, E., García-Pérez de Lema, D., & Maldonado-Guzmán, G. (2016). Management of Knowledge, Innovation and Performance in SMEs. *Interdisciplinary Journal of Information, Knowledge, and Management*, 11, 141-176.
- Viedma, J.M., & Cabrita, M.R. (2012). Entrepreneurial excellence in the knowledge economy. Intellectual capital benchmarking systems. New York, NY: Palgrave Macmillan.
- Weber, A.S. (2011). The role of education in knowledge economies in developing countries. *Procedia Social and Behavioral Sciences*, 15, 2589-2594.