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The Role of Information in the System of Macroeconomic Indicators

El papel de la información en el sistema de indicadores macroeconómicos

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Contents

ABSTRACT:

With onset of post-industrial period in the development of society, the study of the information component and information processes is becoming increasingly relevant. Countries that have already entered the post-industrial stage of development are characterized primarily by changes in the structure of economy: the proportion of information sector in the GDP increases, the part of workers engaged in processing and transferring information in the total economically active population increases too. The worldwide transfer to the information society based on the production, distribution and application of information, alters the formation of social being and consciousness and causes structural shifts and socio-economic changes, which is directly related to changes in material production and in the GDP growth, respectively. Consequently, the post-industrialization of society, the use of innovative products based on the use of the newest technologies, the merging of high technologies directly with the productive force reflects the result of functioning of the market of information resources. The theoretical justification for the information separation into an independent, the fifth factor of the production will make it possible to take into account as accurately as possible the impact of information products on both the company’s activity and the country's economy as a whole.

Keywords: information society, public factors of production, information products, the gross domestic product, system of national accounts, information

RESUMEN:

Con el inicio del período postindustrial en el desarrollo de la sociedad, el estudio del componente de información y los procesos de información es cada vez más relevante. Los países que ya han ingresado en la etapa de desarrollo postindustrial se caracterizan principalmente por cambios en la estructura de la economía: la proporción del sector de la información en el PIB aumenta, la parte de los trabajadores involucrados en el procesamiento y la transferencia de información en el total de la población económicamente activa aumenta. también. La transferencia mundial a la sociedad de la información basada en la producción, distribución y aplicación de la información, altera la formación del ser y la conciencia sociales y provoca cambios estructurales y cambios socioeconómicos, que están directamente relacionados con los cambios en la producción material y en el crecimiento del PIB. , respectivamente. En consecuencia, la postindustrialización de la sociedad, el uso de productos innovadores basados en el uso de las tecnologías más nuevas, la fusión de las altas tecnologías directamente con la fuerza productiva refleja el resultado del funcionamiento del mercado de recursos de información. La justificación teórica de la separación de la información en un factor independiente, el quinto factor de la producción, permitirá tener en cuenta con la mayor precisión posible el impacto de los productos de información tanto en la actividad de la empresa como en la economía del país en general.

technologies.

Palabras clave: sociedad de la información, factores públicos de producción, productos de información, producto interno bruto, sistema de cuentas nacionales, tecnologías de la información.

1. Introduction

The end of the 20th and the beginning of the 21st century is characterized by the entry of humanity into a new phase of its development - the post-industrial society construction. The post-industrial society is a new, higher stage of human development, coming to replace the industrial society, for which the following features were specific:

1. The history moves unevenly, by "jumps", gaps between the ages are obvious, often these are revolutions of different types.

2. Socio-historical progress is fairly evident and may be “measured” by certain criteria.

3. Society seeks to dominate nature, subordinating it and extracting from it the maximum possible.

4. The basis of the economy is an institution of the highest development of private property. The right of property is considered as natural and inalienable.

5. Social mobility of the population is high, the possibilities of social displacement are practically unlimited.

6. Society is independent from the State, a developed civil society is formed.

7. Autonomy, freedoms and individual rights are confirmed by the Constitution as inalienable and inherent. The relationship between individual and society are based on the principles of mutual responsibility.

8. The ability and the willingness for changes and innovations are recognized as the most important social values.

The era that replaced the industrial society has received several names:

– post-industrial society (A. Downson, Z. Brzezinski, A. Tauren, O. Williamson, O. Toffler, J. Fourastie, J. Schumpeter, etc.)

– knowledge society (P. Dretske, P. Drucker, VL Makarov, F. Makhlup, F. A. Hayek, A. I. Tatarkin, M. Scheler, etc.)

– information society (D. Bell, DK Galbraith, V.M. Glushkov, N. Luhmann, M. Castells, M. McLuhan, I. Masuda, M. Poniatowski, A.V. Sokolov, J. Habermas, PA Sharikov, Y. Hayashi, and others).

The concept of the post-industrial society appeared in the 1960s in the USA, the Soviet Union, and Japan almost simultaneously. However, the concept of "post-industrial", in contrast to the "industrial", "agrarian" and other societies does not contain information about the basis, the foundation of society, it only separates the new society from the old one. In the USA, it was assumed that the industrial society was replaced by technotronic, “super-industrial” (Toffler, 1970) society, based on the development of artificial intelligence and computerization of all fields of activity. The transfer to post-industrial society began in the late 80-s of the last century in the USA and Japan. Their economy, the most advanced at the time, allowed not only to resolve most of the social problems of these countries (it was traditionally considered that the transfer to post-industrial society is possible only when industrial society can direct its resources not to provide social problems, but to resolve scientific and technical tasks), but also to make a qualitative leap in information technologies, and the most important - to make them available.

Modern civilization is an information society, it means that information and knowledge become the main products of manufacturing, and the development of information and telecommunication technologies, manufacturing of information products and services (development of networks, computer industries, information technologies, mobile communications, etc.) becomes the main direction of economic activity concomitantly with manufacturing industry and agricultural sector.

Therefore, the economy of a modern society, which is post-industrial, information society, "knowledge society", is a service economy . At present the main value is information in one form or in another. The objective of this study is to theoretically substantiate and determine the place and role of the information product in the system of macroeconomic indicators.

2. Literature review

Information (information product) as an object of market economy began to be studied relatively recently, no more than 30-40 years ago. A number of information features, such as relative alienability, dependence of price on relevance, etc. highlights information products from other goods and services (Limarev & Limareva, 2018; Potrebin, 2015; Jones, 2012).

Factors of production as the basis of the national economy have been studied by many researchers. At the end of the 18th century, Adam Smith (2017) proposed labor, land and capital as the necessary factors of production. K. Marx (1951) detailed the factors of production proposed by A. Smith and examined them from the point of view of the labor theory of value, dividing them into personal and material factors of production - the ability of a person to work (labor) and the means of production, which include the means of labor and objects of labor. A. Marshall, who united classical economic theory and marginalism, opposed K. Marx, considering the detailed elaboration proposed by Marx and Engels to be excessive (Marshall, 2006). Neoclassical theory (McConnel & Bru, 2000) proposed an entrepreneurship as the fourth factor of production.

With the development of information technologies and the increasing role of information products in the economy, information as one of the factors of production has been suggested by many researchers: A. Berczi (1981), S. Chand (n.a.), R.I. Benjamin and others (1984), C.S. Walter, R. Kendall (1990), R.A. Boggs (1990), Y.H. Al-Mamary and others (2014), A.D. George and V.S. Babu (2016), E. Brynjolfsson and L. Hitt (1997), J. Freiden, R. Goldsmith, S. Takacs, C. Hofacker (1998) and others. Knowledge as a production factor was suggested by M. Enachi (2009) and U. Witt, T. Brokel, Th. Brenner (2007). The researcher S.O. Okpighe (2015) proposed the concept of the seven factors of production (the concept of M5I1T1), including materials, money, machinery, labor power, management and time in the list of factors apart from information.

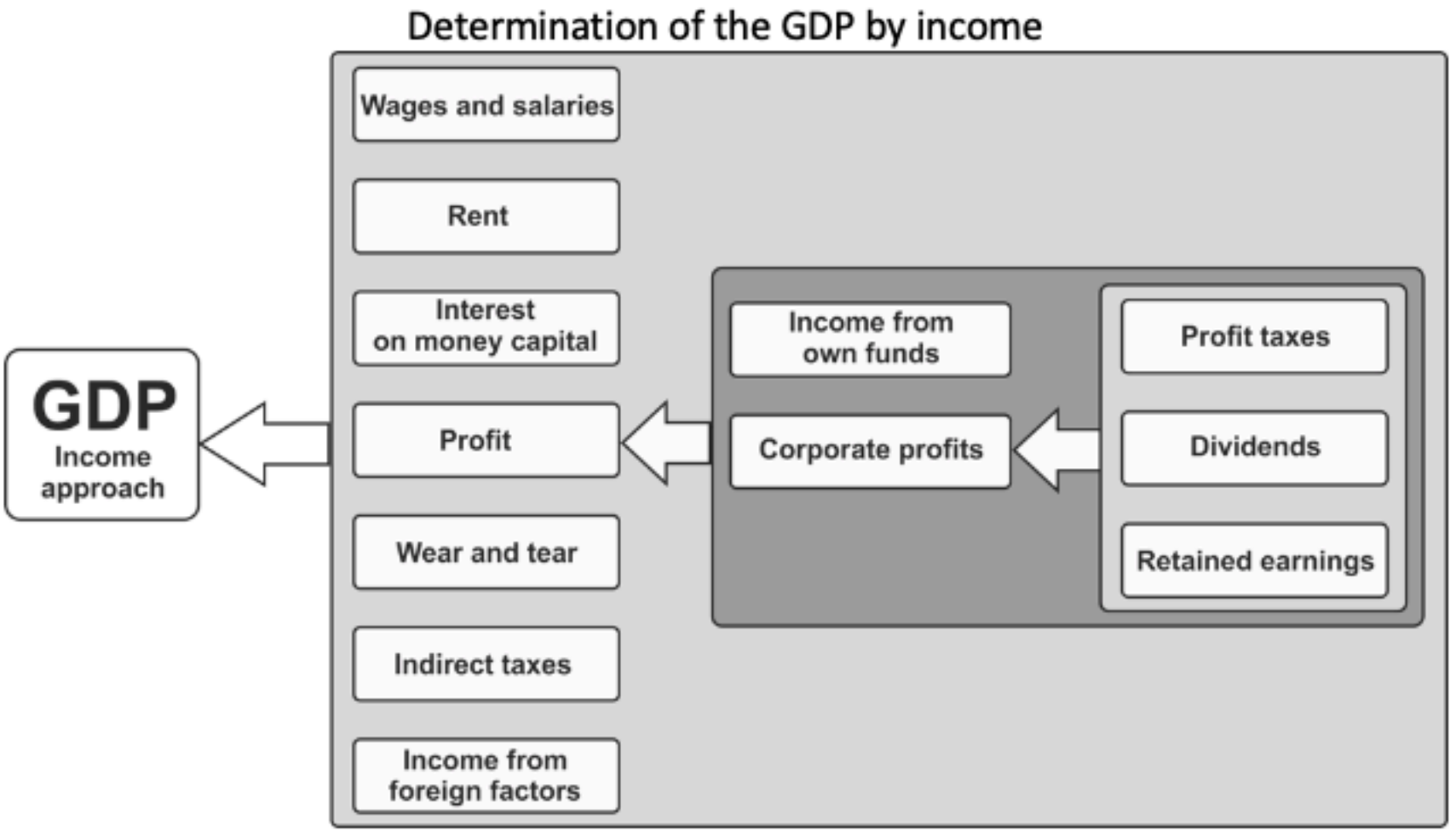
Despite the fact that different researchers refer to information resources in different ways, including sometimes omitting the importance of information, all modern economic theories consider information as one of the factors of production. However, up to the present day no attempt has been made to determine the place of information in the system of macroeconomic indicators, which is the system of national accounts.

Traditionally, economic theories, including Keynesian, consider four factors of production: capital, land, labor and entrepreneurship. But such an approach is out of date, under conditions of an institutional economy that dominates in post-industrial society, it is impossible to deal with just these factors. The appeared means of communication have brought economic, including market, relations to completely different level. The development of the economy of any society depends not only (and even not so much) on the availability of capital, land and entrepreneurship, but also on the efficiency of the company in market activities. Efficiency, allowing the company to remain competitive, is fully ensured by the availability of the most relevant information, including institutional information. For today, information products are the most high-demand goods, and are used by organizations operating in all markets. Economic theory takes into account the factors of production in determining the gross domestic product for the system of national accounts. The GDP is determined by two equivalent methods - by income and by expenditure. In the ideal case, these methods should give an equal result, but due to a number of distortions in the statements of economic subjects there may not always be a coincidence.

Accounting for factors of production in the determination of the GDP by income is as follows (Figure 1):

Figure 1

Determination of the GDP by income



Salary is the expression of labor as a factor of production, rent expresses income from land, money capital is taken into account in the interest earned on it, profit expresses entrepreneurship (including income from private property; in some cases income from property is taken into account in rent). Information as a product is inextricably associated with the capital of an economic entity (Artamonov, 2010), however, in order to take into account information products in the capital, a number of clarifications are required.

Capital is defined as an asset of the economic entity. Since the gross domestic product is an object of the system of national accounts (SNA), most often data on the GDP is determined from financial statements. But under existing conditions neither accounting nor management accounting allocates an information product into a separate category of goods or services. Information as an object of sale and purchase is fully taken into account only by its manufacturers and retailers, and even these organizations, despite serious experience (some companies - manufacturers of information products have existed for more than one hundred years), do not associate information circulation with the exceptional role of the information product in modern economy, and, as a result, with the necessity to systematize its assessment. The turnover of information products in organizations that are not related to its manufacturing and sales is often not considered at all, with the exception of advertising expenses. SNA and its indicators (GDP, GNP, NP, etc.) as an institution exists exceptionally for statistical purposes. Whatever these indicators are, they do not affect the activities of economic entities, their assets, or the budget of a country, despite the fact that the sources for their construction are accounting and tax reporting (by the way, economic subjects does not affect their activities, being only the basis for assessing the current situation of the organization). Nevertheless, the system of national accounts is an essential tool for the economic condition of the country determination, and, despite the retrospective function, is the basis for forming scientifically based forecasts of the economic development of the country as a whole. Correct filling of the sections of SNA allows to use the system more efficiently.

Traditionally, the economics distinguishes three types of capital: physical (fixed assets, intangible assets, the material part of working capital, i.e. stocks, work in progress, finished products in warehouse, etc.), cash (funds of the company on hand and on operating accounts) and financial - investments in financial instruments - stocks, bonds, authorized capital of other companies, etc. - serving for receiving passive income). In this case, information may only be recorded in intangible assets that are objects of legal rights -

licenses, patents, software, databases and other assets that do not have a real form.

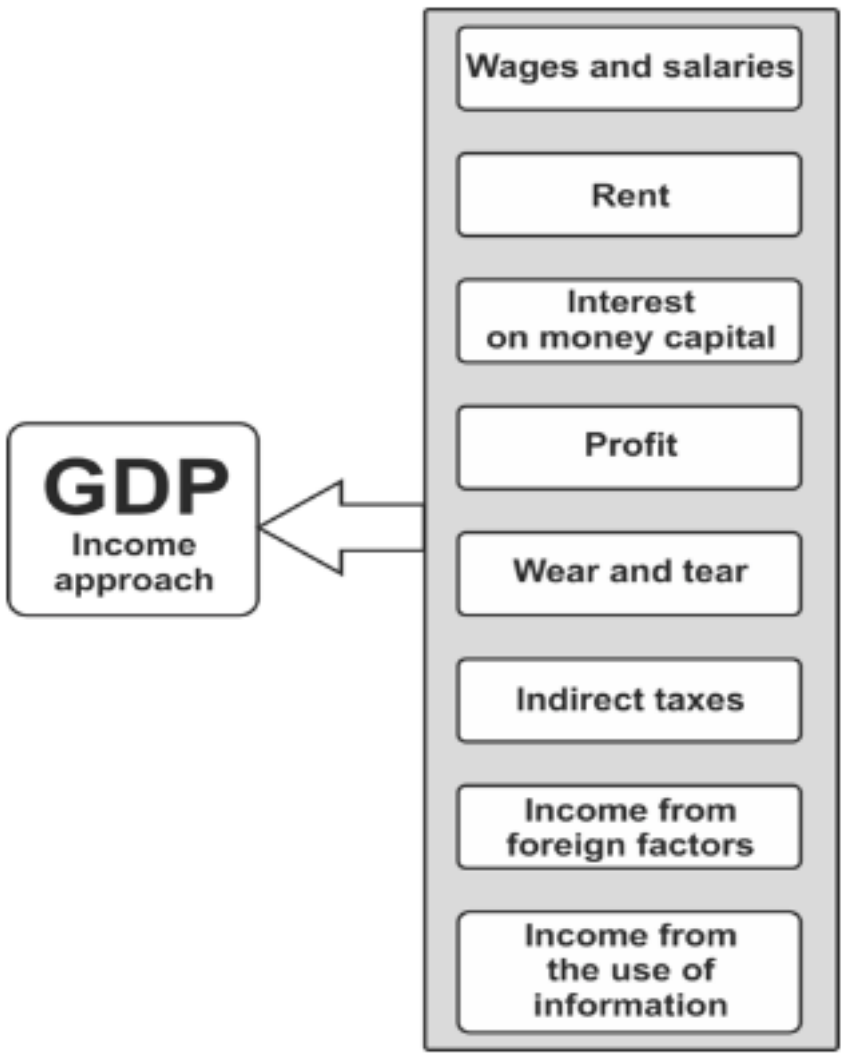
Intangible assets are essentially an information product, since they fully satisfy its definition. However, in the capital of abundance of information products that influence the activity of company, only a small part of information products is taken into account. Meanwhile, the economic activity of the company depends on a variety of information products that are not fixed intangible assets. All information used by the company has a certain value, and as a result of its acquisition, the company achieves certain results. Consequently, we can present information as a special economic benefit and economic resource.

The change in the role of information in the company activity, moreover, the special role of information in the economy at the macro level that has arisen in modern conditions requires the extraction of the information product into a separate, the fifth factor of production along with land, interest, salary and profit.

When information is extracted as a separate factor of production, intangible assets will be excluded from capital as a factor of production, since they differ from other information products not by economic but by legal parameters, and from an economic point of view they will be included in this fifth factor of production.

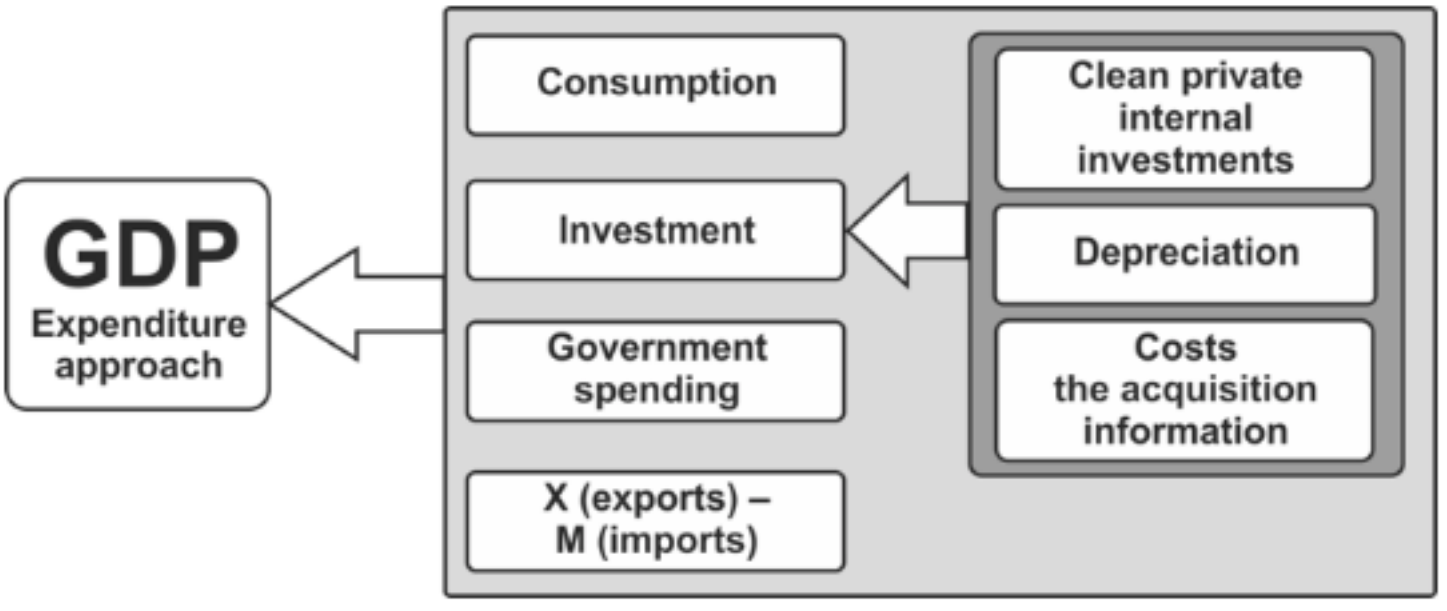
Therefore, the determination of the GDP by income may be represented as follows (Figure 2):

Figure 2
Determination of the GDP by income based on income from the use of information products



Since there are two more ways to determine the GDP, by expenditure and by production, the effect of information on the GDP may be reflected as follows (Figure 3):

Figure 3
Determination of the GDP by expenditure, taking into account the cost of acquisition of information products



3. Conclusion

The given justification for the separation of information into an independent, the fifth factor of production will make it possible to take into account as accurately as possible the impact of information products on both the company’s activity and the country's economy as a whole. By accepting information as a factor of production, we will be able to take into account the turnover of information products not only as part of the company's turnover, but also as part of the gross domestic product. The proposed method of recording information products as an element of the GDP will allow it to be distinguished in the system of national accounts and to use this component in the elaboration of scientific forecasts for the national economy development.

References

Al-Mamary Y.H., Shamsuddin A., Aziati N. (2014). The role of different types of information systems in business organizations: A review. International Journal of Research, I(7), 333-337.

Artamonov A.V. (2010). Information as a factor of production and development in modern economy. **Tambov University Review. Series Humanities**, 4(84), 9-13.

Benjamin R.I., Rockart J.F., Scott Morton M.S., Wyman J. (1984). Information technology: A strategic opportunity. Sloan Management Review, 25(3), 3-10.

Berczi A. (1981). Information as a factor of production. Business Economics, 16(1), 14-20.

Boggs R.A. (1990). Production information systems: Practical considerations and concerns for information resource management. Journal of Information Technology Management, 1(1), 23-24.

Brynjolfsson E. and Hitt L. (1997). Information technology as a factor of production: The role of differences among firms. Working Paper Series 201. MIT Center for Coordination Science. URL: https://ideas.repec.org/p/wop/mitccs/201.html.

Chand S. (n.a.). Factors Affecting Production: Capital, Enterprise, Labor and Land. Your Article Library. URL: http://www.yourarticlelibrary.com/economics/economic-problems/factors-affecting-production-capital-enterprise-labor-and-land/32405.

Enachi M. (2009). The knowledge – as production factor. Studies and Scientific Researches - Economic Edition, 14, 39-43.

Freiden J., Goldsmith R., Takacs S., Hofacker C. (1998). Information as a product: not goods, not services. Marketing Intelligence & Planning, 16(3), 210-220.

George A.D. and Babu V.S. (2016). Information as the fifth factor of production. URL: https://www.slideshare.net/vaisakhsbabu1/information-as-the-fifth-factor-of-production.

Jones S. (2012). Why ‘Big Data’ is the fourth factor of production. Financial Times. URL: https://www.ft.com/content/5086d700-504a-11e2-9b66-00144feab49a.

Limarev P.V. and Limareva Y.A. (2018). Characteristics of the market of information, using in illegal aims. Scientific and Technical Information. Series 1: Organization and Methods of Information Work, 4, 13-15.

Marshall A. (2006). Principles of Economics. New York: Cosimo Classics.

Marx K. (1951). Capital. Critics of Political Economy. Volume I. Moscow: Gospolitizdat.

McConnel C.R. and Bru S.L. (2000). Economics: Principles, Problems and Politics: In 2 volumes. Volume 2. Moscow: INFRA-M.

Okpighe S.O. (2015). The seven factors of production. British Journal of Applied Science & Technology, 5(3), 217-232.

Potrebin A. (2015). Features of information as a product and media-consumption. Methods and web-journalism. Journalism, 446-448.

Smith A. (2017). Study about Nature and Reasons for Wealth of Nations. Moscow: Eksmo.

Toffler A. (1970). Future Shock. New York: Random House.

Walter C.S. and Kendall R. (1990). Information as a factor of production. Journal of Information Technology Management, I(2), 39-42.

Witt U., Brokel T., Brenner Th. (2007). Knowledge and its economic characteristics – A conceptual clarification. Jena Economic Research Papers, 2007-013.

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7. It should be noted that not all regions of our planet can be attributed to a post-industrial society. There are enough examples not only of industrial, but also of feudal, and even primitive communal system.

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