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INFORMATION SOCIETY AND KNOWLEDGE-BASED ECONOMY – DEVELOPMENT LEVEL AND THE MAIN BARRIERS – SOME REMARKS

ABSTRACT. In the article were introduced main features of development of information society and knowledge-based economy, evolution stages of the information society and conception of development the information sector. It was identified the phenomenon of helplessness towards the information source and phenomenon of information exclusion.

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Introduction

The notion of the information society has numerous literature, where there are conditions, which are identified and specified. A certain and real society has to realize these conditions in order to recognise them as the information society. They most often concern wide-thread access to Internet, number of computers *per capita* or number of cell telephones per thousand people. More seldom, one takes into consideration such issues like the following ones, the expenditures on R+D (research & development) or part of sector of information services in gross national product creating.

These definitional shortages join with fact, that the information society and the accompanying knowledge-based economy is at the beginning of its development. In such conditions, it is easy for some simplifications and treating quasi-information society as the information society. The aim of the following article is to identify the attributes and the levels of information society development and knowledge-based economy, and the distinction among information society and quasi-information society.

The applied methodology base on the quasi-dynamic holistic approach, and is useful at the first stage of the analysis. With consideration to the limited volume of this article, one did not introduce the results within model indicatory character. One also did not specify critical levels of these coefficients, and it was not related to the development level in particular countries. It will be a subject of the book (already prepared to printing process), titled: “Information society and knowledge-based economy – development challenges and barriers”.

Notion of information society and knowledge-based economy in the literature – some remarks

The notion of the information society was introduced Tadlo Umeaso in 1963. He defined the information society as the society getting informed through the computer. The first group of definition which one can name “technological” came into being this way. Such definition was also formulated by Martin Bangemann for the European Committee. Information society is “the revolution based on the information, which is a picture of human knowledge. Technological progress makes possible to process, storage, regain and pass the information, in every possible form – verbal, written or visual – unrestricted by distance, time and volume” (Bangemann, 1994). We find similar elements in the definition of OECD (Phillip).

One can find many various kinds of the definition of information society, which show certain aspects of this category, such: (1) technical, (2) economic, based on knowledge development and information, (3) professional, according to which information society creates and extorts the elastic specialization of work and production, (4) spatial, in the state and globe scale, and (5) cultural, emphasizing varied social, psychological, and interpersonal transformations.

Such definitions correlate with the attributes of the knowledge-based economy. Stanislaw Czaja notices: “The economic basis of the information society, knowledge-based economy, is a completely new form of an economic activity. It is mainly based on: (1) domination of knowledge as a fundamental economic resources and production-development factor, (2) the highest participation in the structure of producing the gross national product of information structure, (3) excessive productive possibilities, (4) generating, sending, accumulating and a general use of information-knowledge sets, (5) innovations connected with knowledge, (6) competitiveness based on information, (7) general occurrence and use of new information and communication technologies and (8) the numerous domination of the self-learning organization” (Czaja, 2010, pp.39-40).

Not all researchers accept the notion of information society. Some of them introduced different terms, as for Daniel Bell’s post-industrial society, Alvin Toffler’s third wave society, Peter Drucker’s society of knowledge, Manuel Castells’s network society, or Armand Mattellart communication society. Regardless of the proposed term, these authors agree with the thesis that information society is a new form of organization of the social and economic life. Within that scope, there are no important differences of the views.

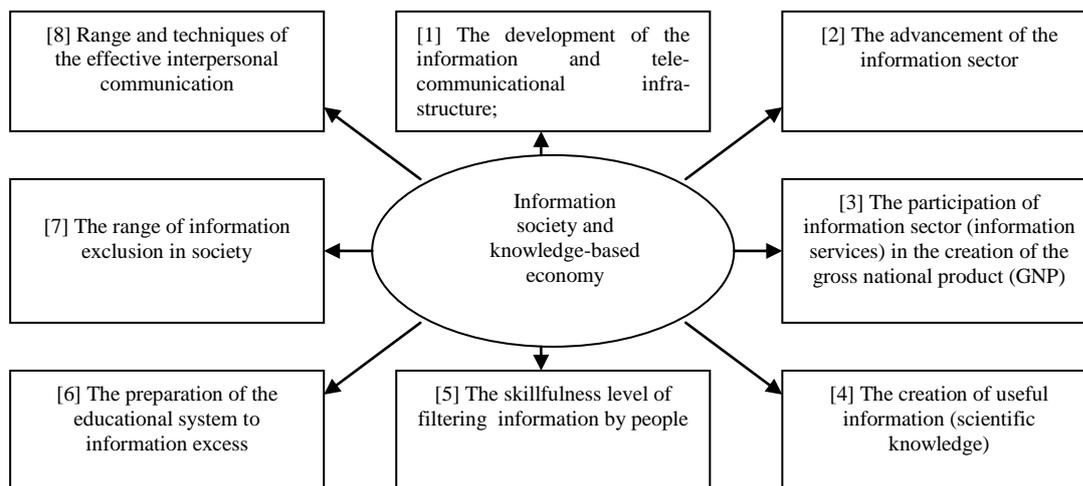
Disputes around the notion of the knowledge-based economy are also multi-layered, and often refer to the notion of information society. The last element should not surprise. How Stanislaw Czaja notices: “The knowledge-based economy replenishes information society in the economic dimension. The knowledge (the gatherings of information) became to be the most important economic resource and production factor (economic development). Knowledge is innovations and the basis of enterprising behaviours. Knowledge also decides about competitiveness. The knowledge-based economy combines relations between knowledge, changes and globalization. The carriers of the knowledge-based economy are among others: the high technique industries, science, education, services connected with knowledge or the sector of information technologies (Czaja, 2010, p. 40).

The knowledge-based economy became, in spite of its notional insufficient precision, a basis for many important documents and strategies such as: “Lisbon’s Strategy” or the World’s Bank idea of knowledge-based economy.

Development attributes and advancement level of information society and knowledge-based economy

The information society and knowledge-based economy allow to distinct several essential attributes (features) of these new structures. The knowledge-based economy can be treated as an element of information society. These features are the following ones (*Picture 1*). Numbers put in the following picture reflect their logical, and in a certain range, temporal order within information society and knowledge-based economy.

The first condition of existence and rise of information society and knowledge-based economy is the development of the information and communication infrastructure. Optical nets, effective computers and software or modern devices of mobile communication create software and the hardware of this infrastructure, at present. The development of the information and communication infrastructure can not hamper censorship, legal restrictions (prohibitions or punishments), significant cost burdens or political and religious constraints. Thus a fight with pathologies is difficult, but at the same time it gives the chances to make mature, wise and participating information society. All restrictions put this development towards quasi-information society.

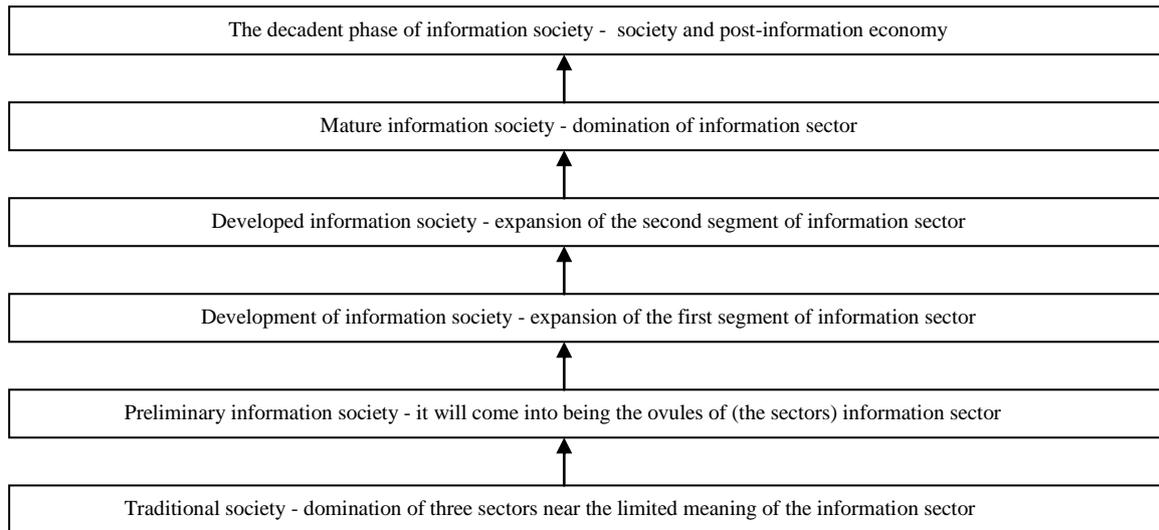


Picture 1. Development attributes of information society and knowledge-based economy

Source: own study.

The information sector makes up a major part of information society and knowledge-based economy. Information sector develops similarly to other structural parts of economy. Initially (the preliminary stage), a sector is not too large, if we measure its sizes by the GDP participation or by the size of employment. The next phase encompasses the stage growth and joins with the expansion of information sector. This stage ends with the phase of saturation which means an achievement of maximum sizes by the sector. This stage is followed by stability stage, and after this one, there is a decadent stage.

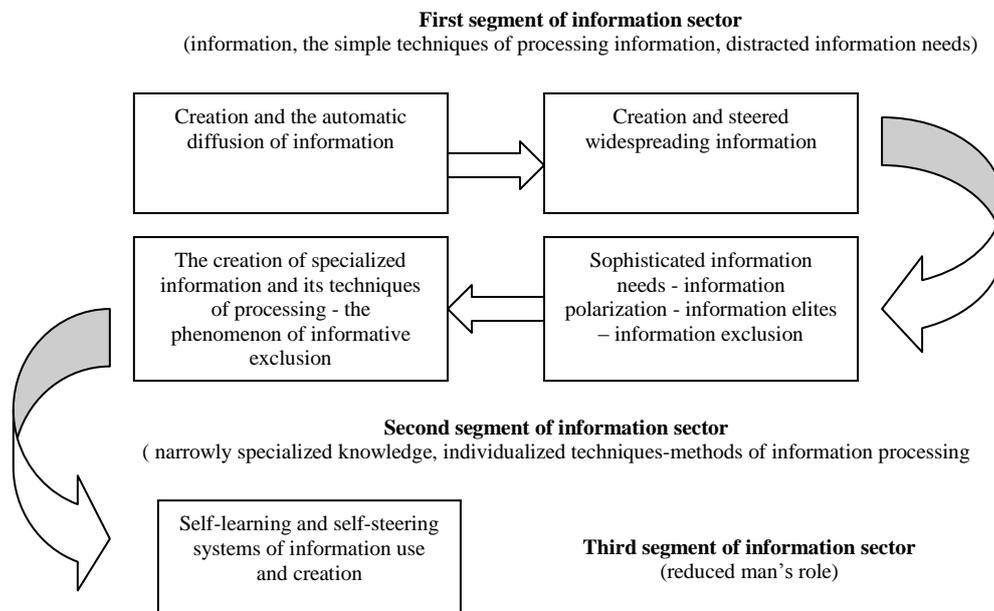
From above mentioned issues we can offer the following development way of information society (*Picture 2*). In accordance with this picture traditional society is subject to transformations in the direction of distinguishing information sector. This sector does not have the internal structure yet and encompasses both the information's creation as well as its (means) methods of its processing and services in this range (*Picture 3*). The next stage of transforming information society will accelerating growth the first segment of information sector.



Picture 2. Development (evolution) stages of information society

Source: Becla, Czaja, Hałasa, 2010, p. 43.

Second segment of information sector encompasses information and the method-techniques of processing and use of information, satisfying, more sophisticated information needs. The growth of the segment meaning of information sector, not only will increase development level of information society, but it will also deepen undesirable phenomenon of progressive information polarization. The second segment of information sector is a real determinant of information society development. Evolution of information society development will cause the number of societies actively creating knowledge (information) and consuming information (passive ones) will increase, in a wider, global perspective.



Picture 3. Shaping information sector in modern information society

Source: Becla, Czaja, Hałasa, 2010, p. 43.

The mature information society is characterized by domination of the information sector, based on its two segments. What will be the next stage of information society development? Present level of knowledge about the evolution of present societies does not give completely scientific bases to such prognosis. One can base on science fiction literature, and philosophical-futurological considerations only. The decadent phase of information society – society and post-information economy – will be characterized by growing domination of the third segment of information sector, which is based on self-learning and the self-control systems of the information use and creation. It will mean a reduction of the man's active role.

Domination of information sector is a significant element of knowledge-based economy. It seen in its ability to create gross national product (GNP), and in the future another measure of social prosperity or life quality and workplaces. Such measurement is relatively easy in the case of GNP, but at the same time a participation of information sector does not have to stand for creating information society instead of quasi-information society. The system of national account records the values of individual transactions, and not identifying their innovation, development consequences or the range of influence. Perhaps, this failure can be eliminated in future by other macro-economic coefficients. However, arbitrary is a decision, how significant the participation of information sector can be in this creation.

In the case of workplaces, one should remember, that the development of information sector will change the character of employment and workplaces in a significant way, not only in this sector, but in the whole economy. More work will be done "in distance", with the use of modern equipment, software, information and communication infrastructure.

In the present information space there are and rapidly grow great sets of information. They consist of:

- scientific information which comes into being on the basis of research and are subject to scientific verification,
- popular knowledge, including information, which is not subject to scientific verification, but is useful in processes of making a decision,
- false information, which are in information space accidentally, without checking their credibility,
- false information, placed in the information space purposely.

Information society and knowledge-based economy bases their functions on the two first sets of information, with special preference of scientific knowledge. This is understood in all developed societies, and finds reflection in the science and technique development.

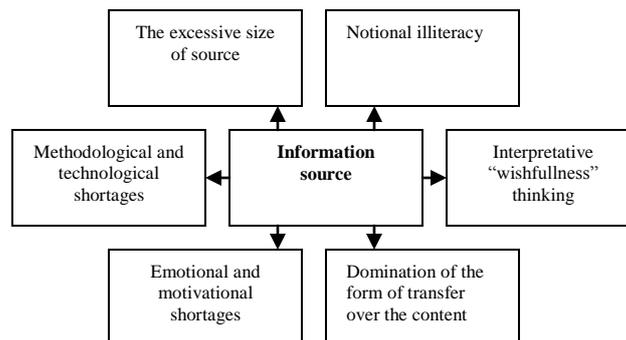
The development of information society and knowledge-based economy is strongly correlated with the skill level of filtering information by individuals. Filtering means, in a certain simplification, to simplify the ability of finding and using useful information for the various forms of economic and non-economic activity. Filtering is particularly essential in the situation of the information excess, when having suitable review methods and techniques information selection decides about costs and time of access to indispensable information. The skills of filtering information become elementary in information society. Their lack or shortage leads, on the one hand to the growth of transaction costs, and on the other to the phenomenon of information exclusion. Too low skill level of filtering and the lack of mechanism of their quick diffusion lead to quasi-information society.

The skills of filtering information should be shaped, first of all during the education. School education within the information society and knowledge-based economy delivers the basic set of indispensable methods and techniques in this range. Next education levels concentrate on their improvement and extension, similarly as various forms of informal education. Information society generates the need of the permanent education, what

additionally changes a character within its accomplishment. The insufficient preparation of the present systems of education towards new challenges results from too violent passage from “situation of the shortage of information” to “the situation of its excess”, deepened by redundancy of information and information noise. These none-adaptations generate one of the most difficult problems of information society and knowledge-based economy – information exclusion.

In the literature „one can define the notion of exclusion of digital as inequality in the access to information, knowledge and education, which modern computer technologies make possible. It does not refer only to having new technologies, but also it introduces a problem of complex socio-economic dependencies and constraints within telecommunication, and computer science infrastructure (The extra science. The information society, 2011, p.18). Information exclusion is the effect of phenomenon “helplessness in the face of the information source” (*Picture 4*). It is a quite general phenomenon, seen not only in societies deprived of formal elementary education systems (pre-educational societies), but also in information societies. In both cases, the causes, which cause them to happen are very similar to each other, although they represent various development level.

The society – information and quasi-information, generate huge quantities of information, what can it lead to phenomenon of an information noise. An information noise tends to be treated as information space overfilling with information which is not specified regarding value (usefulness) of particular information. It means that there are unusually valuable and completely useless information next to each other and even harmful.



Picture 4. Cause of a phenomenon “helplessness towards information source”

Source: own preparation.

There are several causes of information noise (Becla, 2004). First, the XX century brought development of extensive systems of national account organized in frames of state’s structures. Initially, these systems were created on various notional and methodological bases. System of national account is being still developed and enriched with new coefficients and measures, in order to describe the changes of socio-economic prosperity and life quality. In last twenty years, a lot of new measures and coefficients concern the strategy of sustainable development.

Second, the development of decision techniques based on information, caused that many systems of generating and gathering such information were created. They were used by micro-economics subjects (enterprises and financial institutions), government agendas and council authorities.

Third, computer techniques development allows to gather and use considerably more information, in the figure of systematic monitoring phenomena and economic processes.

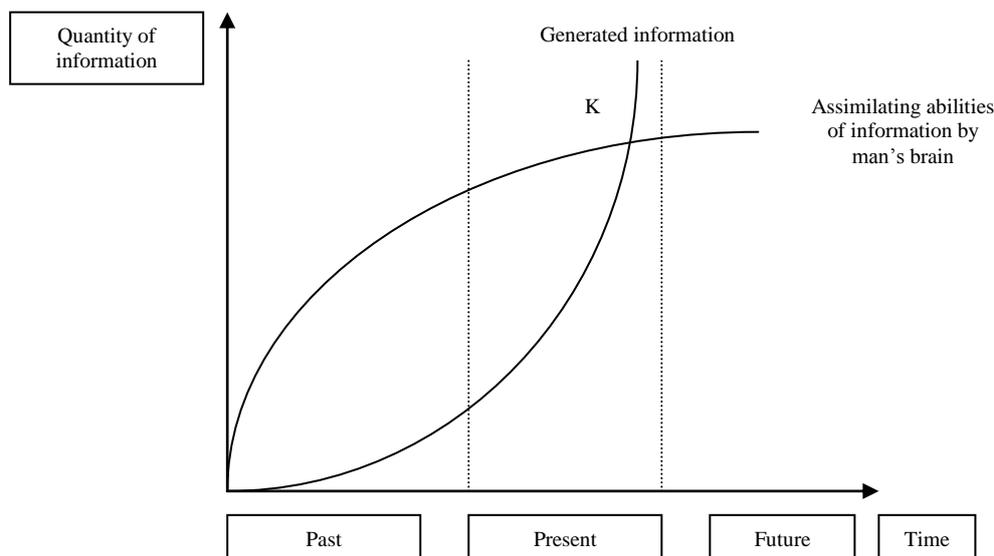
Fourth, the formation of an information noise is strengthened because of the existence of mass-media, especially television, radio, newspapers and nets organizing cyber-space (for example Internet).

The development of information society and knowledge-based economy will lead to the creation of new techniques less or more effective interpersonal communication, based not only on the use of modern techniques, information and communication infrastructure, but first of all, the use of scientific knowledge and wisdom, understood as the proper, liberal approach towards human knowledge and possibility. The existence of quasi-information society will mean a lack of such communication, but not a lack of information society.

Ending remarks

At the turn of 20th and 21st century a quantity of created, gathered and available information uncorrelated with research methods and possibilities of the information absorption by the man's brain. One can picture the following picture (*Picture 5*). It is hard to unambiguously verify if the critical point K, in which the quantity of generated information crosses the absorptive ability of the man's brain, was already reached (Czaja, 2002, pp.79-80). If a modern man is on the curve of absorptive ability of the man's brain before the point K, it means that he/she possesses also some certain possibilities in the range of heuristic-intellectual processing of information. However, in the opposite case, there is a threat connected with limited and diminishing possibilities of capturing of much bigger information sets.

What kind of man's reaction can it be on the critical situation described by the point K? First kind of reaction will mean to look for new, better in terms of productivity and effectiveness of information's filtering methods, and managing information. Such innovative attitude will characterize certain participation of information society (information elite). Different reaction can be connected with a phenomenon of "helplessness towards information source" and information exclusion.



Picture 5. Relationships among the quantity of generated information and the abilities of assimilating information by the man

Source: Czaja, 2002, pp. 79-80.

Much more clear disproportion appeared among the increase of sizes of available sets of information and methods of their filtering and use. It creates new challenges in four main surfaces: (a) for modern science and its research methods, including disciplines engaging information (for example information economy or theory of information), (b) for the technical-program (information technology) means of gathering and processing information, (c) for the education system, especially in the range of creating the skills to filter, and gather information, (d) for the methods of valuing, and managing information, including cyberspace, the Internet.

The interest in information society and knowledge-based economy is justified in the light of civilization transformations' changes. It allows to formulate certain desirable sequence, and directions of farther research on information society and knowledge-based economy. They should go into following direction: (1) elaboration of certain definitions of these notions, (2) the study of proper measurement methods of development, and (3) the use of received cognitive and implementation results, especially for prepared strategies or policies.

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