KNOWLEDGE AND INFORMATION - FACTORS OF ECONOMICAL AND SOCIAL DEVELOPMENT

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ABSTRACT: This work develops a view over the more and more important role that knowledge and information begin to play in all the aspects of life. Also, the work analyses the concepts of economy based on knowledge and informational society, with the implications and links between them, regarded from several economic perspectives. The conclusion reached is that nowadays' society is in a continuous transformation and that without information and knowledge one cannot cope with the progress of humankind, and the society of knowledge and the informational society are factors of globalization, which will give a new configuration to economy.

KEY WORDS: knowledge society; informational society; the new economy; information; knowledge

JEL CLASSIFICATION: A10, F01, O30

1. INTRODUCTION

The new society which we are in represents a stage of human civilization, a lifestyle, which uses information in all aspects of human activity and existence. People invest more and more in equipment for spreading and processing information, in software, and society creates new tools which apply to information, accompanying the technological, economical, cultural, scientific, social process. 15-20 years ago, between

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users and computers there was the analyst, the computer programmer, the data operator, the data controller, the administrator of the information archive.

The characteristic organisational entity was the computing centre, with tens or hundreds of people, most of them operators. At present, the contact between users and the TIC system is direct, the users manipulating friendly static devices (for example PC) or mobile devices (for example PDA), probably being identified by the use of microprocessor cards.

Of course, the economical and social process from the past was also based on progress in knowledge, but, in contemporary economy the speed, by which knowledge is renewed, changes. When this becomes higher, the volume of knowledge that we have at our disposal increases, and knowledge becomes an elementary organisational principle of our existence.

Knowledge may have different forms, as it results from an OECD report which introduces the following four knowledge forms:

- **Know-What** - refers to factual knowledge, the closest to information, which is necessary in many domains, as baggage of elementary knowledge for solving certain problems
- **Know-Why** - represents the scientific knowledge of the natural, social, political etc. principles and laws. The production and distribution of these pieces of knowledge usually take place in academic environment and within the public or private scientific centres.
- **Know-How** - refers to the skills and pieces of knowledge necessary for solving certain problems. The documentation which refers to the way in which a mechanism works and the selection and training of the personnel are just a few examples.
- **Know-Who** - is a set of knowledge having a greater and greater significance. It involves having information about who knows how to do certain things. It also involves special social relations, developed over time, by activation within a certain domain.

The same study considers that the first two types of knowledge may be codified and can almost become market goods, being accessed in preset legal conditions, whereas the last two types of knowledge, unspoken, are intangible and thus hard to convey and to have their value enhanced.

Knowledge is no longer limited to objective knowledge which characterizes scientific rationalism, but becomes socially disseminated knowledge, interdisciplinary knowledge. Knowledge itself becomes the most efficient economical resource in the production of goods and services, but also a type of merchandise which can be marketed as the results of research-development, of market information, assistance, and professional formation (Sabău, 2001, pp.52-53).

Thus, the evolution of mankind to informational society, through computing, represents the major trend of contemporary world. Informational society is the type of society whose material and spiritual civilization dedicates the decisive role of information and knowledge as sources of economical performance, of rationality, coherence and synergy of the social action.
2. INFORMATIONAL SOCIETY – SOCIETY OF KNOWLEDGE

2.1. Informational society

The concept of informational society was first used in 1980 by the Japanese researcher Yomeji Masuda in order to express the essence of the post-industrial society, as opposed to the previous industrial society. After becoming in the 90s a tangible reality of the economically advanced countries of the world, informational society represents a strategic stake for all the civilized countries, as informational society has as defining features: the dominant weight and critical importance of informational resources and knowledge in the system of available resources; the main role in scientific research activities and in technological innovation; the emphasis of the informational dimension and of labour concept, the high evolution of the economic sector of informational goods production and distribution.

It is not the information that represents the defining element of informational society. It is the knowledge. Even though every day mankind produces huge amounts of information, as data collections from all activity domains, not all of them are knowledge. "A piece of information from a book or available on the internet becomes knowledge only after is has been read and understood." Consequently, what distinguishes knowledge from information is the human factor and its ability to assimilate and manipulate abstract concepts, for practical or merely theoretical purposes (Ailioaie, 2002).

Information is a restructuring factor both for the social development and for the economical thinking. According to the academy member Mihai Drăgănescu, science and technology, as information, are incorporated in the labour force, as knowledge. But in production information is a resource similar to raw materials, being thus a means of production. Moreover, information is the expression of knowledge which has become a production factor, and on the other hand, "intelligent" information is becoming the most important resource for the increase of the labour productivity. Intelligent information may lead the production activities, without the direct involvement of man, having a mediation role between labour force and the other means of production. Intelligent information begins to be an active agent of the present social reproduction.

The defining elements of the strategies, policies and actions for the informational society have as a result the development of the communication infrastructures, the creation of adequate software tools, the development of hardware, the development of digital content and more notably, the creation of individual skills in using information and enhancing its value. These elements are in fact elements of transition from the informational society to the knowledge society, the society in which man knows how to enhance the value of information and to turn it into knowledge. In this way, knowledge is founded on the enhancement of the value of information. In the knowledge society, the value of information is variable, according to the context, according to the circulation speed and the way in which it is received and used by the individual informational culture.
In Robert Reich's conception, as opposed to what the prophets of the "information era" have predicted, many well paid services continue to exist even for the ones having an elementary education, and many routine-like activities, activities of processing data still hold a great importance. "The ones who really support the informational economy - says R. Reich - are the armies of informaticians staying in the back offices at the computer terminals connected to the information banks of the whole world".

Thus, informational revolution enabled an increase in productivity, but it "has also produced huge piles of raw information which need to be processed in about the same monotonous way in which the workers from textile industry processed other piles of raw materials" (Reich, 1996, p.152). Other writers say because computers were brought in the working places, the demand for labour force, especially for the qualified one, has increased during 1970-1995, in comparison to the period between 1940-1970, but it is also to note the impact of informational technologies over the health of the workers, for instance burnout and stress (Katz & Krueger, 1997).

One of the most interesting attempts to aggregate information ("computing industry", respectively "information industry") in the whole contemporary economy belongs to the American economist Marc Porat. From the very beginning of the 70s, he considered that American economy was made out of four sectors: agriculture, industry, services and information. Information took over a part of services as well as a part of industry. Based on certain ingenious calculations and approximations, Porat reaches the conclusion that in the USA, between 1850-1980, the number of the population in the services sector has risen, reaching 45% as opposed to 6% in the middle of the 19th century.

In what concerns the decrease of the number of population in agriculture as opposed to the increase of the number of population in industry, this change has been the subject of some wide analyses, accompanied by corresponding conclusions. In the specialty literature it has been reflected the considerable - absolute and relative - increase of the population from the services sector, this surpassing the one in industry. Less highlighted has been the evolution of the informational sector (the branch of information), which according to Marc Porat, contributed in 1980 by 50% to the creation (production) of the national revenue (Gross National Income). Beyond these figures' approximations, of a very high importance is the concept of the American author regarding what the information sector is.

Marc Porat reckons that information sector is divided in two subsectors: primary and secondary.

The primary subsector of information comprises: the industries producing and selling informational machines (not only electronic equipment, but also typewriters, pens, paper etc.): industries selling informational (informatics and non-informatics) services.

The secondary subsector of information comprises all those activities which sell informational services, these being divided into: public or state bureaucracy; internal "bureaucracy" of private companies.

During the last decades of the former century, the two sectors (primary and secondary ones) were in parity. That means that the market information and the
internal information contributed almost to the same degree to achieving the part of the national revenue due to informational industry.

The conception of Marc Porat is an important starting point in going deeply into the analysis of the informational sector and in the information society.

It may be considered that information production has entered a new stage, because of the electronic processors and informatics software, industrialisation stage of information which "compels to a redefinition of industry and to the acknowledgement of information as an important economic sector". This acknowledgement is founded on the idea that human society does not directly derive just from the nature laws, but also depends on the information created, got and produced in people's lives. In his view, the involvement of man in the production of information has three stages: creating, acquiring and producing information.

Creating information is an ability that only humans have, by their new ideas, in any sector of activity.

Acquiring information may take place through scientific research on nature, by discovering regularities and features of nature, of economical and social life. This ability belongs both to humans, and to artificial intelligence more and more. By using, for instance, expert-systems for different domains of science, one can get new information, one can infer new regularities or one can even interpret new facts in correlation to the old ones.

Finally, producing information takes place in the current production activity in any domain. This involves collecting information regarding the current activities, as well as processing information, without inferring new principles and regularities. Information, like any other goods, is produced through work. But, unlike other goods, it has certain features which make it revolutionize economy and society.

Information is not consumed and it doesn't get used in the same way as other goods do. It doesn't get lost unless its physical support is destroyed. But because usually information can be stored in several copies, it does not involve an irreversible loss. On the other hand, although it can be affected by moral wearing, information does not get worn completely, in the way that operational information becomes statistical-historical information which can still be useful.

Information is collected and enriches over time, becoming more and more efficient, having an increasing value of use. Unlike other goods, this one can be used in every production cycle, without it being necessary to be produced again. Due to the use of computing technologies and based on the flexible automation of production, man will get a greater quantity of free time for creative activities. In this way, man will have more time to create and to get new informational goods. And so, a new development of the informational possession will take place.

Information becomes an endless resource, after it is absorbed economically speaking. The increase of informational possession will be done practically without limits, information being stored in smaller and smaller quantities of substance, with less and less energy consumption.

The informational goods have a semantic content, a feature that the other goods don't have. Information on paper does not have a semantic content, until it is read and it enters the human mind, but when information on microelectronic support
acts upon reality and "understands" a domain of reality (artificial intelligence), then it has an incorporated semantics, a structural semantics. But this semantics cannot be assessed from a quantitative point of view. In other words, the meaning of information cannot be assessed in quantity (perhaps just through the number of key-notions and links between these notions). The semantic content of information cannot be measured, but we can measure the volume of information and informational possession may be, from this point of view, partially assessed in quantity by this information volume, measured in units such as: bytes, kilooctets etc.

On the other hand, one cannot give economical value to the semantic content of information, exactly because it cannot be measured. For example, the value of a printed book does not depend on its specific semantic content, but more on the expenses for printing and for the copyrights. Any information involves costs for its creation and production through work. It absorbs these costs in a certain amount of time. We can reach the conclusion that any information tends to the economic value equivalent to zero, as a reflection that information semantics doesn't have economic value. Only the support, the copy and the distribution of information will keep their economic value, but to a smaller extent. That is the reason why informational possession will consist of a piece of information assimilated, which no longer has economic value and a piece of information produced more recently, which still keeps its economical value for a certain amount of time.

Informational possession becomes an important economic resource, while the whole mankind can benefit from it. The relations between the developed and less developed countries in information domain should take into account the economic features specific to information. Once economically absorbed, a piece of information should become available anywhere in the world, especially for the productive process, not just for the scientific one; otherwise, there emerges the danger of a form of economic exploitation marked by the rules of an economy unadjusted to the new informational reality. The ability to generate information, as an expression of the creative potential of the nations, is more and more important, and developing a own scientific apparatus, adequate to the requirements and possibilities of national economy, becomes the key-factor for supporting economic growth on long term and for transition to the new economy.

2.2. Society of knowledge

In the specialty literature, Laurence Prusak emphasizes the role of knowledge as production factor. To him, knowledge represents an intellectual capital: "the only thing that gives an organisation a competitive edge - the only thing that is sustainable - is what it knows, how it can use what it knows and how fast it can know something new".

Roger Bohn shows that it is important to understand the technological knowledge that is the knowledge about the way to produce goods and services. Bohn makes a distinction between data and information, between information and knowledge. Data come directly from measuring one or several variables; information is data which have been organised or structured in a certain way, placed in a context and having a meaning. Information shows the condition of the production system and of a
Knowledge and Information - Factors of Economical and Social ...

part of it. Knowledge is more, it tries to understand the process, to produce causal associations, to make predictions and to make prescriptive decisions (Drăgănescu, 2001, pp.36-39).

Mihai Drăgănescu affirms that the society of knowledge is superior to informational society, by the fact that knowledge is based on the enhancement of information value. The society of knowledge comprises the informational and the computing society. The moment we speak about internet, with the great advantages it brings in what concerns the access to information, electronic transactions in short time, e-commerce, e-mail etc. by attracting in the electronic information field as many citizens as possible, we speak about informational society. Knowledge is information with meaning and information which acts.

That's why knowledge society is only possible grafted on the informational society and cannot be separated from it. At the same time, it is more than the informational society by the major role which information has - that of knowledge within society. In his view, knowledge society involves: extension and deep study of scientific knowledge and of truth about existence; use and management of existing knowledge as technological and organisational knowledge; producing new technological knowledge through innovation and encouraging the creation and development of innovative companies, having their own knowledge structure.

Such enterprises can be born by the cooperation between companies, universities and governmental or public institutions. The knowledge society represents a new economy in which the innovation process (the ability to assimilate and convert new knowledge in order to create new services and products) becomes decisive. Innovation, within the knowledge society, seeks to improve productivity, not just classical productivity in connection with work and capital, but also new productivities in connection with energetic resources, with environment protection:

- disseminating knowledge to all citizens by new means, using mainly internet, electronic card, e-learning;
- scientific and technological knowledge, knowledge society being fundamentally necessary to ensure a sustainable society ecologically speaking. Sustainability has become a key-criterion for the ones preoccupied by the quality of the environment. In Brundtland report "Our common future" this involves: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Aceleanu, 2006, pp.72);
- a global character of knowledge and information; thus, knowledge society has a global character and is a factor in globalisation. By both components, the informational component and sustainability, the knowledge society gets a global character;
- a new stage in culture, because on the very first place there will be the knowledge culture, which involves all forms of knowledge, including artistic, literary, etc. knowledge.

One will prepare the environment for what the author called the society of conscience, of truth, of ethics and of spirit, as a next stage of society progress. If to
informational society one applies the vectors of knowledge society, right in the middle of the development of informational society, it is possible to gain time and that's why the actions for the transition to knowledge society must be made simultaneously with the ones regarding the transition from a state of informational underdevelopment to informational development. The pursuit of both objectives must be mixed from the very beginning in order to get to a developed informational and knowledge society.

In his work, "The Third Way", Anthony Giddens analyzes the more and more important role of knowledge as production factor, emphasizing that the most remarkable feature of globalized economy can be synthesized like this: "Science and technology, as well as emblematic talents of humans play a more and more significant role in productivity, and, consequently, in economic growth." The ones who highlight the triumphant side of the global process are given this answer: "Global accessibility of information rather amplifies than reduces uncertainties. But at the same time with uncertainties, the chances of innovation and profit also grow." By this statement, A. Giddens ideologically classifies himself among the supporters of the market economy and the direct purpose of this market is profit achieved through innovations and investments, acquired by those enterprising people who successfully take responsibility for business risk and uncertainties.

Combined with the more general aspects of globalisation, information economy sets a major transition in the nature of economic activity. "Information technology and communication technology are the means which render the new economy possible... But its agents (the ones of the new economy) are the workers with a high level of knowledge - the connected workers and other workers who do not directly work in material goods production. The know-how of such workers is the most precious form of property that companies have" (Giddens, 2001, p.68).

The relation between the means of economic activity and their users, who A. Giddens mentions in order to characterize the information and communication economy, has been widely debated by all economic currents, older or more recent. This, in what concerns the link between the labour factor and capital (physical) factor in the organisation and development of capitalist production, but also in what concerns the human capital and the financial one in contemporary world.

With the entire pleading, offensive adherence, in favour of the new processes in contemporary society, economists still debate the problem of existence or non-existence of a real new economy. They wonder if this is indeed an exceptional process in the history of human civilisation. Some authors state that, after all, many previous changes also had major effects upon world-wide economy. In this way, they use as reference the railway of 19th century, the cars with everything that involved car civilisation in 20th century. "Maybe the revolution in the domain of information technology will be more penetrating than the previous technological revolutions - this is what economists Stiglitz and Walsh are hoping for. Only time will give us an answer to this issue" (Stiglitz & Walsh, 2005, pp.74-75).
2.3. Internet and digital users

The major changes of the last years - exponential growth of mobile communications and internet users, the development of information technology and communication technology, the development of e-commerce - they all support the transition from industrial economy to the post-industrial one, to informational society. Digital information can be transformed in new economic and social values, creating opportunities to develop new products and services, this becoming the key-resource in digital economy. In the figure below you can see the number of internet users in the world by geographic region in 2010.

![Internet Users in the World by Geographic Regions - 2010](image)

Source: Internet World Stats, which is available at: [www.internetworldstats.com](http://www.internetworldstats.com)

**Figure 1. Internet Users in the World by Geographic Regions - 2010**

If at the number of internet users first are Asia and Europe, at world internet penetration rate first are North America and Oceania-Australia.

The study, prepared by the EU commission with a consortium made of three consultancies specialized in media ([Screen Digest](http://screendigest.com), Goldmedia and Rightscom) was an important input for the Commission's proposals on 'Content Online in Europe's Single Market'. Figure 3 is part of this study.
Figure 2. World Internet Penetration Rate by Geographic Regions - 2010

Source: Internet World Stats, which is available at: www.internetworldstats.com

Figure 3. Digital Content Market in the UE, Market size (2005-2010) (euro mil.)

Source: Business & Market Intelligence which is available at: http://www.metrics2.com
3. CONCLUSIONS

Mankind represents today the result of evolution, but this evolution is unconceivable without the fast and profound progress of knowledge and of its promotion in society, but especially in economy. The fact that contemporary organisations are founded on knowledge is inevitable. The fact that they are founded on knowledge means to organisations reaching the stage of full maturity, in accordance with the essence of the informational society that they belong to.

But the development of informational society as knowledge society is conditioned by the presence of some intelligent organisations, with advanced abilities of managing their collective abilities as sources of performance.

Taking into account the fact that a decisive factor of economic growth and life standard is represented by knowledge, turned into innovative products and services, it is necessary that each country assigns the proper degree of importance to research, development and innovation and make the required investments so as not to stagnate.

Informational society is seen as a "society of learning", in which the emphasis is not only on ensuring physical access to communication networks and new communication services, but more notably on the ability to transform information into pieces of knowledge and on education and instruction process in schools, at the work place and at home along the whole life. Informational society offers individuals the information that is so necessary on the environment they live in.

The knowledge society is the purpose and the context of contemporary development, because knowledge is the only resource which grows at the same time with usage. Competitiveness depends on the quantity and quality of knowledge used, and the profitability of any company may grow especially if it makes investments in knowledge production (intellectual capital), rather than if it acquires as many physical assets as possible. The world can't make it anymore without professionalism. Knowledge society imposes professionalism in economy and it imposes technocracy as leaven of the new economy and learning becomes the general process characterizing the new economy.

The new economy of Informational Society - the Knowledge Society must be based on its own means - younger or older, but to another stage of knowledge. The means - new techniques and technologies - are directly related to computing and knowledge and will give, without any doubt, a new configuration to economy as well.

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