THE INFORMATION ECONOMY THEORY AS A LOGICAL STAGE OF POST-INDUSTRIAL SOCIAL DEVELOPMENT

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Abstract. The author represents the new classification of information economy conceptions. There are many different names and directions to study and understand the essence of the new economy: knowledge economy, innovation economy, network economy, creative economy. Representatives of each direction served their own vision as the only correct. In such a situation to form a unified theory of the new economy is important to group concepts for their key competencies and their critical analysis, thats are presented in the paper. We concluded that the concept of technological structures cannot be called a complete concept of the information economy, because of it merely states the fact of technological changes affecting the economic relations and general conditions in the economy. It's proved to use the name of the new economy "information economy" as the most general and comprehensive.

Keywords: information economy, knowledge economy, innovation economy, network economy, creative economy, Castells, Shumpeter, shumpeterian theory.

1. Introduction

The emergence of the information economy is primarily associated not with the development of computer technology, but with a theoretical foundation of the information society functioning. So the history of information economy is closely linked with the formation of people perceptions of the information society features. Information industry, being the basis and core of the information society, civilization is a phenomenon that affects all aspects of life: politics, technology, education, communication relations.

Industrial character is allowed to the information production process by computer technology, new information technology systems and networks applications, low energy demand and other physical and biological resources in the preparation of information products and services, the possibility of rapid transmission of information in real time at any distance. The enormity of this new trend of modern economics confirm the following numbers: information technology world consumption in 2000 reached 4 trillion USD, and doubling occurred in just four years, starting in 1996 (Castells, 2000). Information production in the U.S. and Japan in terms of employment exceeded the sphere of material production. And in the United States in this area in the early 90s was employed for nearly 60% of all employees.

In this regard deserves attention according to some authors that the relative isolation and separation of new areas of activity - production of information - should be considered as the fourth stage of the great social division of labor (Toffler, 1999, Bell 1999).

The development of information technologies have emerged and generated new needs of society. The increasing complexity of industrial production, social, economic and political life, changing the dynamics of processes in all spheres of human activity have led , on the one hand, the growing demand for knowledge, and the other - to create new tools and ways to meet those needs.

According to the calculations of economists, 90% of modern economic growth in developed countries is provided through new knowledge, technologies, various innovations, ie creative labor products of a person. But the result of creative work is an information product, rather than material, which is characteristic of the industrial age.

2. Materials and Methods

The main goal of the paper is to represent the new classification of information economy conceptions. There are many different names and directions to study and understand the essence of the new economy: knowledge economy, innovation economy, network economy, creative economy. Representatives of each direction served their own vision as the only correct. In such a situation to form a unified theory of the new economy is important to group concepts for their key competencies and their critical analysis, are presented in the paper.

To achieve this goal we used methods of comparative analysis, critical analysis, induction. The inductive method was used to identify common patterns in concepts of different authors.

3. Results. The new industry coming to the fore – information industry associated with the production of technical facilities, methods and technologies for the new knowledge production and forward movement of humanity to the formation of new social relations of the information economy.

A critical review of information economics concepts made it possible to identify the following areas of research:

- Fifth sectors economy concept (J. Fourastiй, 1954)
- The concept of technological structures (Tugan-

Baranovsky, Kondratiev, Schumpeter, Glazyev)

• The concept of the key factors for economic development (Kader , 2008 Marhinson , 2009)

• The concept of information capital (T. Stonier, 1983)

The important advanction in information economy theory development was the book 'The Great Hope of the 20th Century', written by French sociologist and economist Jean Fourastiй in 1949. Jean Fourastiй introduced the concept according to which the national economy should be divided into three sectors: the primary sector includes agriculture, mining and manufacturing, and in the secondary sector - industrial production, while the tertiary sector - services. This view is shared by many scientists as Colin Clark, Manuel Castells and others. But especially noteworthy is the fact that Jean Fourastiй was the first who proposed to change the criteria and objectives of social and economic development: quality of life, social security, blossoming of education and culture, higher level of qualifications, humanisation of work, and avoidance of unemployment. According to Jean Fourastiй's opinion, the optimal structure of the information society will be achieved when the production of intangible goods (or services) will be about 85-90% of the economically active population, and 10-15% – in all other. He said that the third phase of civilization will occur when 70% of the GDP belongs to the tertiary sector, 20% - to the secondary and only 10 % - to the primary sector. It should be noted that the economy of Ukraine is only the first stage of civilization in accordance with the Jean Fourastiй's concept, as the vast majority of it's GDP is produced by agriculture, manufacturing and mining industries.

Later Jean Fourastiй's followers added quaternary and sectors of the economy in this classification (Foote, Nelson N.; Hatt Paul K, 1953). Thus, quaternary sector includes information technology, consulting, education and research, and quinary sector - culture, health, entertainment. It was the first hypothesis of information economics.

The quaternary sector of the economy was proposed as a way to describe a knowledge-based part of the economy (Selstad, 1990). The quaternary sector consists of those industries providing information services, such as computing and information and communication technologies, consultancy (offering advice to businesses) and researching, particularly in scientific fields.

The technological and innovative approach to the classification of the stages of economic development named as information economics concept of a technological structure has also deep roots.

There is established view especially among economists of Europe and USA that primacy belongs to Schumpeter in this field of study of economic progress through innovation. Even the information economy called "Schumpeterian" (Bradford DeLong J., Summers L. H., 2001).

In new economic conditions, or as J.B. DeLong named in a "Schumpeterian" economy, the decentralized economy does a much less good job. Goods are produced under conditions of substantial increasing returns to scale. This means that competitive equilibrium is not a likely outcome: The canonical situation is more likely to be one of natural monopoly. But natural monopoly does not meet the most basic condition for economic efficiency: that price equal marginal cost. However, forcing prices to be equal to marginal cost cannot be sustained because the fixed set-up costs are not covered. Relying on government subsidies to cover fixed set-up costs raises problems of its own. Therefore, it destroys the entrepreneurial energy of the market and replaces it with the group-think and red-tape defects of administrative bureaucracy. Moreover, it is innovation that is the principal source of wealth in an Information economy — and temporary monopoly power and profits are the reward needed to spur private enterprise to engage in such innovation. The right way to think about this complex set of issues is not clear, but it is clear that the competitive paradigm cannot be fully appropriate.

We suppose Tugan-Baranovsky found the technological and innovative approach to the classification of the stages of economic development in his theory of crises, continued by his follower Kondratiev, proposing the concept of "long waves".

Schumpeter himself, describing the genesis of theories of cyclical fluctuations in the economy in fundamental work "The History of Economic Analysis", concluded forming at the turn of two centuries generally methodological basis for most of the different theories. This basis is called a provision allowing a major factor cyclical fluctuations associated primarily with the nature of fluctuations in production "plant and equipment" or "capital goods ". Schumpeter calls this the achievement of economic thought of the period, and noted that "we can associate the specified achievement - or the overwhelming share in this achievement – to the works of Tugan- Baranovsky" (Schumpeter, 2006, p.1125-1126).

Tugan-Baranovsky's cycle theory explains why there are some periods in which initially accumulate great masses of debt capital that can not find a use, then there is a turbulent investing. But the question arises as to what kinds of fixed capital invested free cash capital? Answers to this question led to the development of innovative theories. Direct development the Tugan-Baranovsky's theory gained through work A.Shpithof and J.Schumpeter.

Kondratiev confirmed that his ideas about the great cycles he drew from the theory of Tugan –Baranovsky: "It is true that some of my concepts relate with the concept of Tugan-Baranovsky. But it is also true that there is no simple transfer theory of Tugan -Baranovsky. I believe Tugan-Baranovsky's idea of "free capital" accumulation and the role of accumulation is very great. Otherwise, my concept is deeply different from the concept of Tugan-Baranovsky. And I do not see anything wrong in order to rely on the provisions made in the past and are considered the true". This side of the Kondratiev theory, due to the peculiarities of accumulation of capital in new industries, and became a backbone for the further development of innovative contemporary neo-shumpeterian theory.

Kondratiev processed data of most developed capitalist countries (USA, UK, France and Germany) and empirically found that there are short and long cycles of

capitalist production. During this time he discovered almost three full cycles long average duration of 55 years each. The main cause of these cycles is the need for renewing constant (basic) capital - the emergence of new technologies as well as industries. Following this model, he predicted the Great Depression of 1929-1933 setting to reverse the cycle, he also made a long-term forecast up to 2010, anticipating the end of the fifth cycle in 2011-2013 and occurrence in connection with the next economic crisis.

The next step in this direction was the creating Schumpeter's concept of innovative economic development. According to it, every cycle of economic development was divided into two parts:

• Innovation - the creation and implementation of new technologies,

• Simulation - the spread of new technologies.

Schumpeter studied that past "new economies," past economic "revolutions" have also seen extraordinary growth in technology, the rise to dominance of new industrial sectors, and the transformation. The 50 years after the invention of electricity, 1880 to 1930, saw an increase in the mechanical horsepower applied to U.S. industry of perhaps a hundredfold and an enormous increase in the flexibility of factory organization—a rate of technological progress of more than 9 percent per year. The hundred years from 1750 to 1850, the core of the (technological) industrial revolution itself, saw British textile output multiply thirtyfold; in the middle of the 18th century it took hand-spinning workers 500 hours to spin a pound of cotton, but by the early 19th century it took machine-spinning workers only three hours to perform the same task—a rate of technological progress of 10 percent per year sustained across half a century (Freeman and Louca).

Thus, many economists believe this concept is the beginning of the information economics theory, "new" economy.

In fact, the concept of technological structures proposed by the Russian economist Glazyev in the early 90 years of 20th century is a continuation of the Tugan-Baranovsky, Kondratiev and Schumpeter views. According to this concept, the technological structure (TS) is a set of technologies that are specific to a certain level of production, due to scientific, technical and technological progress in the transition from lower to higher and advanced modes.

Technological structure covers closed reproductive cycle from extraction of natural resources and vocational training to nonproductive consumption. There is macro production closed cycle within TS, including mining and reception of the raw resources and materials all stages of processing and production of a set of end products that meet such public consumption.

• First TS. Period: 1770-1830 years. Core: Textiles, textile machinery, pig iron, iron processing, construction of canals, water engine. Key factor: Textile machine.

• The second TS. Period: 1830-1880 years. Core: The steam engine, railway construction, transportation, machinery, coal, machine-tool industry, ferrous metallurgy. Key factor: Steam engine machines.

• Third TS. Period: 1880-1930 years. Kernel: electrical, heavy engineering, manufacturing and rolling steel lines, inorganic chemistry. Key factor: Electric, Steel.

• Fourth TS. Period: 1930-1970 years. Kernel: Automotive, tractor, nonferrous metallurgy, production of durable goods, synthetic materials, organic chemistry, production and refining. A key factor: the internal combustion engine, petrochemicals.

• Fifth TS. Period: 1970 - up to 2015. Kernel: Electronic engineering, computing, optical fiber equipments, software, telecommunications, robotics, production and processing of natural gas, and information services. Key factor: microelectronic components.

These earlier transformations revolutionized their economies' leading industries and created "new economies." They changed the canonical sources of value and the process of production.

The industrial revolution itself triggered sustained increases in median standards of living for the first time, a shift to a manufacturing-heavy and then to a services-heavy economic structure, changed what people's jobs were, how they did them, and how they lived more completely than any previous economic shift, save the invention of agriculture and the discovery of fire.

The economic transformations of the second industrial revolution driven by electrification and other late 19th-century general-purpose technologies were almost as far reaching: mass production, the large industrial enterprise, the continent wide and then worldwide market in staple manufactured goods, the industrial labor union, the social insurance state, even more rapid sustained increases in median living standards, and the middle-class society.

In fact, innovation is not always form a new phase of the economy. But consider another extraordinary wave of innovation that did not create a "new economy." William Nordhaus has analyzed the real price of light—how much it costs in the way of resources and labor to produce a fixed amount of artificial illumination—and has found that the real price of light has fallen by a thousand fold during the past two centuries. A middle-class urban American household in 1800 would have spent perhaps 4 percent of its income on illumination: candles, lamps, oil, and matches. A middle-class urban American household today spends less than 1 percent of its income on illumination, and consumes more than a hundred times as much artificial illumination as did its predecessor of two centuries ago.

Yet, we do not speak of the "illumination revolution," or of the "new economy" generated by the existence of exterior streetlights and interior fluorescent office and store lights. The productivity of illumination-producing technology has increased enormously, but its impact on the economy and on society has been limited. Demand has not grown rapidly enough to offset falling prices. The total share of illumination in total urban spending, and, thus, the share of illumination production in the urban economy, has shrunk. Our artificial illumination technologies are an enormous boon and source of value—Nordhaus believes that it has contributed 7 percent to the growth of real wages during the

19th and 20th centuries—but its economic salience has been limited.

We concluded that the concept of technological structures cannot be called a complete concept of the information economy, because of it merely states the fact of technological changes affecting the economic relations and general conditions in the economy. This research is the experimental level, which only indicates the presence of new economic circumstances without explaining their nature and impact factors.

These studies on classical classification belong to the positive economics, and in fact, the descriptive focus of economic research. By the way, this division into positive and normative economics is a rather dubious character. We propose a classification of its own economic study that would better reflect their nature and location of each study in the science system: an experimental level, subject level and initial baseline.

Experimental statistical studies are descriptive in nature and are intended to describe the current economic situation. Subject level of research reflects the main factors that affect the functioning of the economic object. The concept of the key factors for economic development we took to the subject level.

The concept of economic development key factors unite together different stages of the information economics theory, and the name itself dependent on a key factor as authors believe, played a crucial role in economic development: the post-industrial economy (Masuda, 1980); Information Economy (Stonier, 1983, 1989), Network Economy (Castells, 2010), the Digital Economy (Kim, 2002), The Knowledge based economy (Eliasson, 1990; Knol, 2001; Kader, 2008), who believed that qualification, knowledge research are key factors in economic development and finally Creative Economics (Marhinson, 2009).

H. Cader notes the analysis and discussion of the knowledge-based economy could proceed in two categories (Cader, 2008). In the first, emphasis is placed on firm-level production, where knowledge is considered a factor or part of a factor of production, known as the “knowledge economy” (Schumpeter, 1939). In the second category, the focus is the aggregation of firms within a geographic region with the necessary infrastructure to utilize the full potential of the knowledge economy, also known as the knowledge-based economy (Sahal, 1981; 1985). Since the latter embodies the former, and the former is part of the latter, these two categories go hand-in-hand. Much of the current literature focuses on the latter category, and, indeed, some knowledge-based regions are growing faster than others with lower aggregate knowledge levels.

Another area of research was experimental economics. Using the Experimental Digital Economy (EDE), a new technology infrastructure that we have developed for a digital economy, we propose a new research methodology, a virtual field experiment, which makes it feasible and effective to test research hypotheses with the desired level of experimental controls and to probe successful business strategies in a real business world. Summaries of research on a digital economy, like the efficiency of a digital market, the effectiveness of digital markets (posted-price markets and auctions), and the impact of quality certifications, address the implications of virtual field experiments (Knol, 2001; Kim, 2002).

S. Marginson and P. Murphy presented their new research that investigates the emerging set of complex relationships between creativity, design, research, higher education and knowledge capitalism (S. Marginson, P. Murphy, 2009). It highlights the role of the creative and expressive arts, of performance, of aesthetics in general, and the significant role of design as an underlying infrastructure for the creative economy. Authors tracks the most recent mutation of these serial shifts - from postindustrial economy to the information economy to the digital economy to the knowledge economy to the 'creative economy' - to summarize the underlying and essential trends in knowledge capitalism and to investigate post-market notions of open source public space. Their hypothesizes that creative economy might constitute an enlargement of its predecessors that not only democratizes creativity and relativizes intellectual property law, but also emphasizes the social conditions of creative work. It documents how these profound shifts have brought to the forefront forms of knowledge production based on the commons and driven by ideas, not profitability per se; and have given rise to the notion of not just 'knowledge management'.

It should be particularly noted that spiritual factors take on special significance in terms of the information economy. In particular there are discusses some of the major issues surrounding trust in e-commerce, by first defining the concept of trust before identifying and examining some trust-enhancing strategies, products and services and their impacts. (Guerra et al., 2003) The conclusion uses this review to highlight key future research priorities aimed at gaining theoretical and practical insights into how the needs of consumers, citizens, business, government and other stakeholders can be taken into account in a balanced way when developing a strategy for building trust in electronic markets.

The famous English scientist in the 80s of last century T. Stonier has made significant contributions in the development of the concept of the information capital. He was the first who proposed the idea that information has the properties of ordinary capital.

T. Stonier predicted that will be a new sector of the economy: information. He argued that information, like capital, can accumulate and store for future use. In post-industrial society, national information resources are converted, as he believed, the greatest potential source of riches. Therefore, we must all forces primarily develop a new sector of the economy - information. "Industry in the new society as a general indicator of employment and its share in the national product will give way to the service sector, which will be a mostly collect, process and various types providing the necessary information" (Stonier, 1983).

In the new economic circumstances, information industry is considered as a process of transforming information resources into benefits to satisfy the needs of humanity. Each

specific production process of information products and services is characterized as a specific set of factors and stable relations between them, which are expressed in the form of applied technology as a particular combination of stable factors of information production.

The primary purpose and meaning of the activities in the information industry is the transformation of information processing and information resources and to ensure consumer access to information they need. Production information rather than tangible product becomes the driving force of economic development, and the latter, in turn, becoming more concise information.

The current trends in the development of the information economy are such that information sector is consistently ahead of traditional industries in terms of growth, employment, and for other economic indicators.

4. Conclusions

Today there is no one doubts the fact that the information economy is replacing the industrial way of economic development. Skip to Information (post-industrial) society requires more profound transformation since the information becomes a factor in the main subject of the production and consumption of socio- economic system. The processes thats cause significant changes in the system of the productive forces of the modern world economy, providing information as crucial important means of labor. At the same time information is the subject of labor to be transforming, processing, storage, transmission, consumption in the process of physical, intellectual, cultural and spiritual production.

Thus, information is crucial resource not only for the production of knowledge, as well as in the field of industrial production and services. In addition, as a result of the information production we obtain information product that you can promote on the market as an information goods under special laws of information marketing.

Therefore, based on this thinking we can conclude that the information economy as a new form of economy has the all its components and categories, but the processes occurring under special laws, which do not always correspond to the laws of classical or neo-classical economics.

Today, these trends have priority for the development of the national economy. In this regard, we should talk about the relevance for economic science to task the establishment and development of a new field – economics of information production or, in other words, the information economy theory.

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