

Post-industrial Society: Structure, Features, Mechanism and Regularities of Formation

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Abstract: The paper presents the main points of the theory of post-industrial society, its methodology, the definition, criteria and features of the transformation of society from a pre-industrial, industrial to post-industrial society, the mechanism is defined and the legal conformities of post-industrial society formation are formulated.

Key words: post-industrial society; economy structure transformation; service economy; information society; knowledge society

JEL codes: B40, L80, O11, O18, O33

1. Introduction

The issues about the formation of post-industrial society remain relevant for decades among analysts of various theoretical and practical spheres. This paper presents some results of a long scientific research of the economic theorist and proposes answers to questions, such as what the post-industrial society is, what its characteristics are, how is it formed and how is it possible to estimate the level of its development.

Post-industrial society has come to replace the industrial one due to the introduction into industrial and agricultural production of automatics and information technologies, resulting in increased labor productivity and expansion of the service sector in the GDP and employment. New technological base has contributed to the increase of intellectual level of labor and required better level of education of employees. Effective mass production of the industrial age has created the material basis for raising the significance of such spheres as science, education, health, reflecting the level of welfare of citizens and the quality of socio-economic growth.

Recently a post-industrial society has been formed and develops in a number of countries. The Republic of Belarus, as part of the world economic system, sets as a target to form the foundations of the post-industrial society with a new technological basis to 2020 (1) and transition to the post-industrial society and innovative development of the economy to 2030 (2). It provides the evidence of the need for the development of the theory of post-industrial society and the development of a conceptual approach to the improvement of the modernization policy for the Belarusian economy to achieve the set goals.

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2. Literature Review

Representatives of the theory of postindustrial society D. Bell, O. Toffler, P. Drucker investigated new trends in society transformation in 1960-1990s., the follower and popularizer theory of postindustrial society in postsoviet science was V. Inozemtsev, V. M. Kulkov.

D. Bell laid the methodological basis of the postindustrial society theory, pointed to the trends of economic development in the postindustrial society

- results of theoretical knowledge are systematically used in production and increase labor productivity;
- enhance intellectualization;
- contribute to the importance of science and education;
- the share of services in GDP and employment is growing; the share of highly educated workers increases;
- need to solve the conscious control of scientific and technological progress and introducing its achievements into production (3).

E. Toffler (4) and P. Drucker (5) noted an increase in the intellectualization of labor, production and consumption, formation of innovative bases for economic development. V. L. Inozemtsev (6) supplemented the theory of postindustrial society by studying the evolution of labor motivation and values, developed the concept of a post-economic society. V. M. Kulkov (7) pointed to the increase in the role of non-material factors of development, increasing the role of state regulation of the economy, strengthening the social orientation of economic relations.

In general, the theory of the post-economic society is based on the conclusions of the theory of the postindustrial society, often these concepts are used as synonyms, but it should be noted to emphasize the displacement of the subject of research in the theory of post-economic society in the sphere of management relations both on micro- and macro levels. While the theory of post-industrial society focuses on the impact of technological progress on changes in the economic and social structures of society.

3. Methodological Issues

The theory of post-industrial society has a long history of development with periods of popularity and oblivion. Since the introduction of this concept, it was considered futurological, therefore some researchers have suggested their own vision of the course of events (post-capitalist society, post-bourgeois society, post-industrial capitalism) while others remained adherents and defenders of industrial (or neo-industrial) society.

At the end of XX century showed the signs of transformation of the society in the developed countries. Despite the acuteness of the crisis in the transition countries of the former socialist system, it has attracted the attention of the scientific community and increased the number of scientific, journalistic publications and dissertation research, analyzing the new features of economic development of industrial society.

The carried by the author analysis has showed that 1) the scientific research on this topic is focused either on any one aspect of the formation of post-industrial society, which is typical for young scientists, or on an extended philosophical approach; 2) the theory of post-industrial society has been criticized for fuzziness, blurring the definition of “post-industrial society”, understatement of the role of goods production, streamlined approach to the allocation of services sector, exaggeration of the role of information in the process of value formation, ignorance

of cultural aspects of the development and global problems. Despite the big load of criticism, the theory of post-industrial society obtains the right to exist and being developed, since it explores the up-to-date problems of the modern changing world.

The methodology of the theory of post-industrial society has been developed through a systematic approach by the application of the principle of the unity of “historic” and “logical” as a method of scientific knowledge, as well as the addition of the positivist approach to the normative component. Historicism, lying in applying a phasic approach (allocation of society’s development stages — pre-industrial society, industrial society, post-industrial society, as well as three stages of the post-industrial society formation) and the use of the axial principle (analysis of the system relationships along the axis — the type of production and types of used knowledge (technologies)), was supplemented by an evolutionary approach (study of the causes and characteristics, identification of regularities of gradual transition from industrial to post-industrial society).

The logical principle consisting in defining the system of categories and analyzed matters, has been complemented by the structural analysis (study of the changes in the structure of employment, production, expenditures of households), and the index method (working on the index of post-industrial society development, the index of the dynamics of demand and productivity in the sectors of economy). Development of the methodology of positivism and strengthening the normative component manifested in the fact that in addition to specifying the most important characteristics of post-industrial society, separation of the stages of its formation, the socio-economic mechanism and regularities of its formation have been substantiated, the criteria and the method of assessing the level of development of post-industrial society in a particular country have been identified; the conceptual approach and practical recommendations on improving the socio-economic policy in the direction of post-industrial society development intensification have been elaborated.

3. Definition of the Post-industrial Society

Post-industrial society is a society that has come to replace the industrial society where in the result of the introduction of scientific and technological progress, production automation and informatization and labor intellectualization are changing the technological structure (the using innovative and information technologies by business is increasing), economic structure (the share of service sector in GDP and its employment are enhancing), social structure (the share of employees and citizens with higher education is growing, household expenditures on consumer needs are reducing and are increasing on the services with the growth of per capita income).

This definition is different from other in the sense that a structured approach is used, the cause-and-effect relationships of scientific and technological, economic and social development are underlined, the relationship and interpenetration of innovation and information bases of development, the growth of intellectual level of labor, strengthening the role and significance of the service economy are comprehensively covered.

The Table 1 contains the features of pre-industrial, industrial and post-industrial society, by which one can not only characterize each of society, however trace the changes not only externally factors, for example the structure of society and economy, but by internal factors, assess them in quantitatively and by quality. Let us consider in more detail on the characteristic features of post-industrial society.

In the post-industrial society the key means of production are automated technology (robots, computers, software) and knowledge, production items — information and knowledge. The main economic sector is the service, where the information is being processed and new knowledge created.

The key factors of economic development are knowledge-intensive technologies, education of employees. The labor becomes more intellectual and the key incentive to work is no more high salary, but the opportunity of creative self-realisation. Since the salary level allows satisfy all primary needs of an individual, and demand for comfort goods and services appears. The most numerous social group in the post-industrial society are office workers with higher education.

Labor as the production factor was the most accessible resource at any time, whereas its content has been modified in the course of evolution of technological production methods from physical manual through physical mechanical to the intellectual.

Table 1 The Features of Pre-industrial, Industrial and Post-industrial Societies

Features	Pre-industrial society	Industrial society	Post-industrial society
Technological transformation			
Instruments of labor: material	Earth, manual implements	Machinery, money capital	Automated technology
intellectual	Skills	Experience	Knowledge
public	Division of labor	Specialization and cooperation of labor	Science and Education
Technology type	Labor intensive	Capital intensive	Science intensive
Objects of labor: Material intellectual	Raw Material	Energy	Information, knowledge
Economic transformation			
Type of production activity	Extraction	Production	Processing
Leading sector	Agriculture (extractive branches)	Industry, manufacture	Service sector (especially science, education and healthcare)
Consumption type	Products meeting primary needs	Durable goods	Services and comfort products
Social transformation			
Labor content	Physical Manual	Mechanized physical (routine operations), partially intellectual	Intellectual
Motivation to labor	Traditions and non-economic coercion to work	The material (monetary) incentives	Creativity
Key social group	Peasants	Manual workers	Office workers Services professionals
Educational level	The transmission of experience within the family	General secondary, Special secondary	Higher Tertiary

The complex automation of production, the creation of materials with predetermined properties, mastery of new methods the energy production and conversion, its transfer to any distance, replacement of mechanical technologies for informational have contributed to the intellectualization of labor activity, the development of higher education, deepening of its specialization.

The new technological stage of socio-economic development complicates the production structures and processes, imposes the use in the production of not only basic human abilities to work, but also the ability to participate in the scientific research and production management. In the post-industrial society knowledge becomes a need, which allows not only improve the work tools and principles of production and social activities organization, produce goods and services of high quality, but also consume these products and services, create and transmit new knowledge.

The formation of post-industrial society is accompanied by the substitution of the mass production by highly flexible production, aimed for the individualized demand. An employee of such production must be able to develop his creative potential, not only by implementing in the production the science and technology achievements, but also by generating new ideas. The main condition for the efficient functioning of modern production is an employee, prepared for constant changes of the technological process and innovations introduction. In this display, the man at work acts as the engine of scientific and technological progress and the regulator of its priorities.

4. Stages and Mechanism of the Post-industrial Society Formation

Behind stages allocation is technological criterion. Since the post-industrial society has started to spring up in the booming years of industrial society, the technological criterion of the productive process formation didn't let indicate the arising changes in technological basis, but economic criterion and characteristics of the enhancement of the service sector in GDP and employment showed up more intensive. Further automation of all the business processes (accounting, paperwork management, calculations, planning, forecasting, decision-making, monitoring, etc.) brings to the birth of a new type of the industrial activity (development and introduction of information and communication technologies), facilitates the exchange of commercial information, expansion of the traditional services types (connection, trade, finances), allocation of consulting as a separate commercial type (including outsourcing).

The first stage of post-industrial society formation (mid. 50s-70s of the XX century) is characterized by the rapid industrial development and start service sector expansion, the accumulation of scientific knowledge and its gradual introduction in the production of goods, labor productivity growth and the citizens' welfare.

In the second stage (mid 70s-90s of the XX century) happens the computerization of production — information technologies provide productivity growth and the development of new activity types. The latest information technologies are being introduced in traditional production, materials' and energy output-ratio of production are reducing, the degree of production processes automation are increasing.

The third stage (mid 90s-beginning of the XXI century) is characterized by development, based on innovations and overall informatization — increase in knowledge-intensity of production, the growth of expenditures on information technology and equipment, the acceleration of introduction of scientific achievements into business practices, ensuring the competitiveness of the innovation economy.

The economic mechanism of transition of industrial society into a post-industrial is a natural process of transformation (Figure 1).

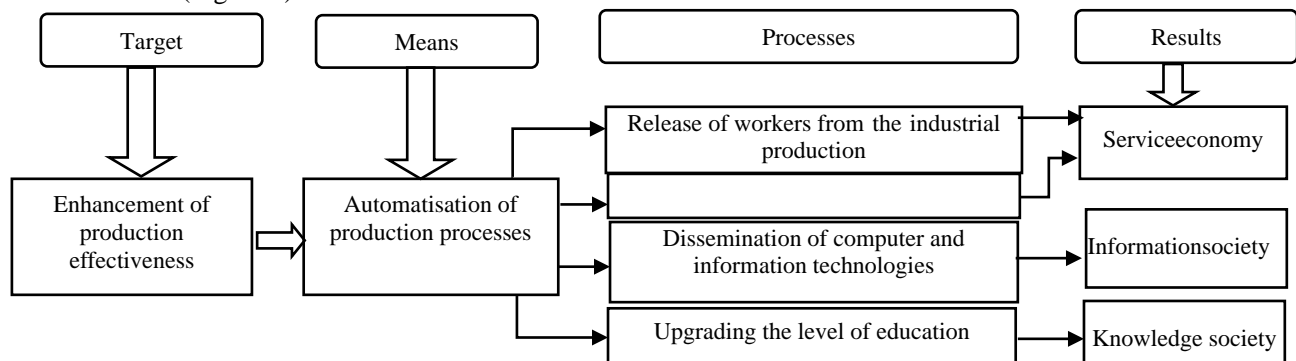


Figure 1 Economic Mechanism of Industrial Society Transformation into the Post-industrial

In contrast to the regulatory mechanism, it does not involve the definition of tools and directions of their influence on the final parameter, whereas represents the elements and processes of transformation, their mutual influence on each other and the results.

With the aim of increasing the efficiency (the growth of salary rates, environmental standards, increased price competition) entrepreneurs have sought to introduce new automated equipment and technology to speed up the exchange of information and management decision-making, which enforced the growth of labor productivity and reduction of the required number of people employed in the manufacture.

At the same time, the increase of the wealth of all social classes has led to increased demand for various types of services and stimulated the growth of the services supply, which has manifested in the growing share of service sector in GDP and employment. New technologies and the expansion of interpersonal communication areas required new quality of human resources, improvement of the level of education and its continuing development.

Thus, three basic elements of post-industrial society were formed:

- information society (as a technological foundation),
- service economy (as the sphere of enhancing the quality of life),
- knowledge society (new system of stratification).

Thus, the technological transformation of production leads to structural changes in the economy and society. On the one hand, the introduction of scientific and technological progress has contributed to reduce the dependence of production on a large number of employees, since the latter have been replaced by automated mechanisms and management systems. On the other hand, the remaining staff needed higher level of education for the effective control of the process. The released from manufacture production workers were in demand in the services sector, the expansion of which has also contributed to the growth of incomes of all citizens. The services sector has quickly become information and knowledge capacious due to the changes in the technological foundations of industrial and agricultural production. Accordingly, the workers with higher education became more and more popular, being able to use the latest information technologies in the production of goods, provision of services and the consumption of new commodities. All this has resulted in the increase of the share of the service sector in the structure of employment and GDP, i.e. took its place the transformation of the economic structure towards its servicisation. In addition, it has changed the social structure of society, in which the share of employees with higher education has grown, the knowledge society began to develop. Technological transformation contributed to the structural transformation of the economy and society.

5. Rules of Post-industrial Society Formation

The transformation of the economic structure and the formation of post-industrial society took place in the developed countries, in accordance with the following regularities:

- 1). reduction of the share of agriculture and industry in the employment and production volumes due to the rapid growth of labor productivity through the introduction of scientific and technological achievements in comparison with the declining growth of demand for food products and a slowdown of growth of demand for industrial products as a result of approaching the physical limits of consumption;
- 2). revenue growth and changing consumption structure in the direction of increasing the share of the services expenditures lead to the outstripping growth of demand for services in comparison with the growth of

labor productivity in this sector, as there are limited opportunities for growth of labor productivity in the services, resulting in the expansion of the services sector;

3). high growth rates of demand for services due to rising incomes contribute to the growth of the relative prices on the services and, accordingly, increase of the share of the sector in GDP. At the same time, the decrease in the relative prices of agricultural and industrial production leads to the reduction of these sectors in GDP. In real terms, the volume of industrial production and agriculture, having reached a certain limit, is stabilizing, but its share diminishes, since the real GDP growth is largely due to the growth in the service sector.

The main forces of interaction and changes in the market economy are supply and demand. There and non-price factors interactions for a long time have affected the economic structure and made her evolutionarily transform. From the demand side this is a change in the level of income (ΔD), from the supply side — the change in labor productivity (Δy). By virtue of the law of Engel and introduction of scientific and technological progress take place the changes in the ratio of demand and productivity growth in various sectors that affect their role in the economy.

Engel law is the economic law, whereby the consumers' behaviour is interconnected with the income rate, and with the growth of income rates goods consumption by population is increasing disproportionately. Expenditures on food are increasing less than the expenditures on durables, travelling or savings. The structure of food consumption changes towards the products with better quality. Income rates growth leads to increase in savings share and consumption of high-quality goods and services with the low-quality ones falling away. Grounding on the income elasticity of demand formula, it has been calculated, that at the end of 1980s in the USA with the income rates growth up on 1%, the demand for goods grew up on 0.77%, clothes - on 0.32%, vehicles - on 1.1%, accommodation - on 0.89%, medical services - on 1.9%, luxury goods - on 3.6%, sport goods – 3.7%, taxi services – 2.8%.

Figure 2 shows the rules and correlation of the factors of transformation of the economy structure in the framework of a three-sector model, where β is the share of the employed in the sector, Z is the share of the sector in GDP, ΔL is the change in employment, ΔP are price level changes.

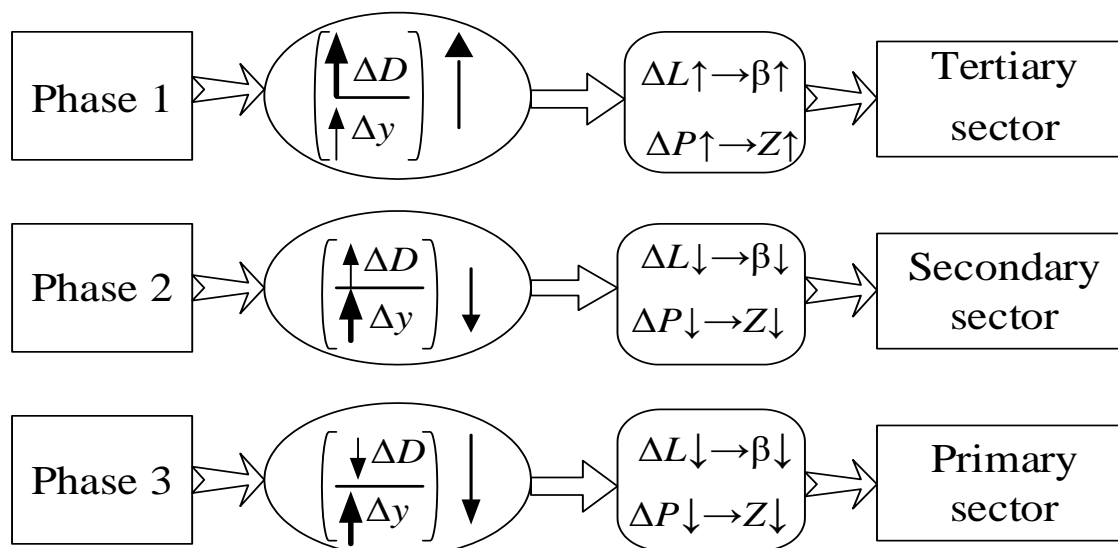


Figure 2 Rules of the Economy Structure Transformation Postindustrial Society

In Figure 3 one can see the ratio dynamics of all quantities when each sector pass off three major phases of development.

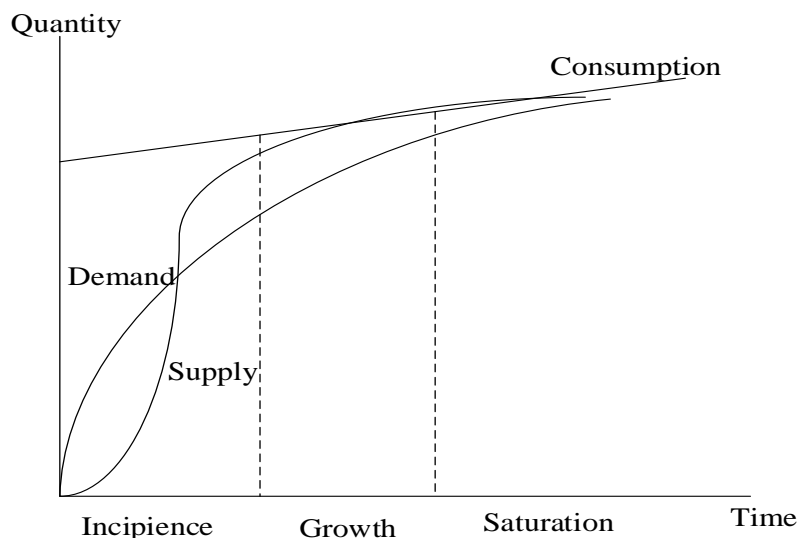


Figure 3 The Dynamics of Supply and Demand on the Stages of the Sector Evolution

As incomes rise according to Engel's law, the share of funds allocated for food in the structure of expenditures of the households decreases, whereas the share of manufactured goods and services is increasing. In the early days of the industrial society, the increment of growth in demand for industrial products should outpace the increment of growth in productivity, and then, thanks to the slowdown in demand due to achievement of the physical limits of saturation, the productivity is growing faster, which ultimately leads to the release of the industry's employees. At the same time, the continued growth in income contributes to a significant increase in demand for services, therefore the service sector is expanding its scope and increasing employment, this way the industrial society moves to a new form - the post-industrial society.

Productivity growth in the industry is stipulated by the possibilities of the physical standardization of goods production, organization of mass production, new technologies allows now to create not less efficient batch or single production. At the same time, a significant acceleration the labor productivity in all kinds of services at this stage does not occur, since their provision requires physical human participation.

The achievement of high economic growth and standard of living only through the development of service sector for the countries, seeking to create a post-industrial society, is accompanied by the following problems:

- the growth rates of labor productivity in the service sector are much lower than in industry, so economic growth and living standards are slowing down;
- lack of competitiveness of industrial production leads to problems with the balance of payments, and the export of services is limited due to the small list of "tradable items" and their low competitiveness in the world market;
- service sector expansion and enhancement of its quality should be done within the country by increasing the demand for it from other sectors of the economy, as well as when as the demand for them from consumers increase.

6. Conclusion

The result of this research is to develop the theory of post-industrial society in such directions as the development of its methodology, specification of the definitions, criteria and features of the transformation from pre-industrial, industrial to post-industrial, the description of the mechanism and the formulation of regularities of the formation of post-industrial society.

Formation of the post-industrial society is an evolutionary process of human development, the ability to use the results of scientific achievements to improve the life conditions of an individual and society post-industrial countries. The quality of life in these countries is not getting worse, despite the economic slowdown, the frequency of crises and large income differences, furthermore they become less dependent on the resources, previously supplied from less developed countries, however more and more depend on the creative activity of scientific researchers and entrepreneurs.

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