Inzinerine Ekonomika-Engineering Economics, **2011, 22(4), 367-379**

Knowledge Economy: Synergy Effects, Interinstitutional Interaction and Internationalization Processes

Borisas Melnikas

Vilnius Gediminas Technical University
Sauletekio av. 11, LT-10223, Vilnius, Lithuania
e-mail: Melnikas@vgtu.lt

crossref http://dx.doi.org/10.5755/j01.ee.22.4.712

Various aspects of the synergy effects, the new tendencies of the processes of creating knowledge based society and the knowledge economy, as well as institutional interaction and the processes of internationalization of scientific and technological progress are described in the article.

The main idea is that the creation and development processes of the knowledge based society and knowledge economy may be attributed to the category of synergy effects oriented processes, therefore, all general phenomena and characteristics of synergy effects oriented processes in general, are absolutely typical for the creation and development of the knowledge based society and knowledge economy.

The institutional interaction and the processes of the internationalization of scientific and technological progress could be described as the typical synergy effects oriented processes. The institutional interaction and the processes of the internationalization of the scientific and technological progress analyzed in the general context of the creating of knowledge based society and knowledge economy.

The new definitions of the knowledge based society and knowledge economy are described. The main principles of creating the knowledge based society and knowledge economy are presented.

Creating and modernization of the knowledge based society and knowledge economy are very complicated processes, oriented to the formation of the new quality of society and qualitatively new lifestyle, these processes may be described as "twice" as complicated, because they win distinction by orientations to the pursuit of new quality in two aspects:

- the knowledge based society and knowledge economy, compared to "traditional" society and economy, are in all cases described as qualitatively new;

- creating and development of the knowledge based society and knowledge economy takes place under the conditions of the global changes, which means that qualitative changes take place in all global space, the essence of those changes is the creation and spread of the knowledge based society and knowledge economy.

A special attention is given to the conclusion that in the environment of the knowledge based society creation and generating knowledge economy and development, the provisions for effective institutional interaction and for complex cultural, mental, social, economic and technological interaction in the context of internationalization processes should be attained.

The following general conclusions are made:

- the processes of creating knowledge based society and generating knowledge economy and its further development should be understood as the undivided unity;

- the processes of creating knowledge based society and generating knowledge economy and its further development should be perceived as relevant to all spheres of life – meaning social, economic and political life, culture, advancement of science and technologies, interaction with nature in general and environment in particular;

- the processes of creating knowledge based society and generating knowledge economy and its further development should be comprehended as the ones providing economic preconditions for the modernization of the society and refinement of its life in accordance with the standards, norms and values of knowledge based society;

- the processes of creating knowledge based society and knowledge economy and further development should be interpreted as a multi-dimensional and extremely complex and uninterrupted process which manifests itself in cyclical changes and leaps towards higher quality standards;

- the complex approach towards knowledge based society and knowledge economy creation and further development should be implemented in all stages of scientific research, studies and practical activities, including the prioritizing various programmes on multi- and cross-disciplinary research and studies, as well as strategic solutions of the complex character in various stages of regional development, planning and designing of economic and technological leaps.

- the processes of creating knowledge based society and knowledge economy and further development should be analyzed and assessed in the context of the priorities of synergy effects oriented processes, including – processes of institutional interaction and internationalization of the scientific and technological progress.

This article provides exhaustive exploration of the possibilities to improve the institutional interaction, including - interoperability among different systems operating in the overall scientific and technological progress, in addition, it discloses principles of mutual interoperability among the organizations operating in scientific research, training, studies, consultancy and business development and other entities, as well as trends for the development are highlighted here. The main focus is put on the internationalization processes and state policies in science and technology.

The processes of creating knowledge based society and knowledge economy and further development should

be analyzed and assessed in the context of processes of globalization and internationalization, as well as processes of global transformations.

Keywords: *knowledge society, knowledge economy, institutional interaction, internationalization, scientific technological progress, phenomena of knowledge economy creation processes.*

Introduction

The creation and development of the knowledge based society and knowledge economy are perceived as one of the most important *priorities* of the modern society and its lifestyle development, as well as of social, economic, political development, science and technological progress.

The creation and development of the knowledge based society and knowledge economy are assessed as *the most important assumption* and *the main way* to solve most of the social, economic, technological, even security and defense problems worldwide as well as in various countries or regions in general and in various countries or regions in the space of the European Union (Boldrin, Canova, 2001; Cohendet, Stojak, 2005; Currie, 2000; David, Foray , 2002; Dicken , 1998; Ein-Dor, Myers, Raman, 2004; Farnsworth, 2005; Garrett, Mitchell, 2001; Goeransson, Soederberg, 2005; Grace, Butler, 2005; Hayo, Seifert, 2003; Hunt, 2000; Huseman, Godman, 1999; Leydesdorff, 2004; McNally, 1999; Melnikas, 1990, 2002, 2008; Melnikas, Reichelt, 2004; Merrill, Sedgwick, 1997; Munasinghe, Sunkel, de Miguel, 2001; Olsen, Osmundsen, 2003; Parker, 1998; Perraton, 2001; Redding, Venables, 2004; Sangmon, 2002; Steinmueller, 2002).

The creation of the knowledge based society and knowledge economy expresses the *essential qualitative changes* in all the areas of social, economic, political life, science and technological progress, and interaction with nature. The creation of the knowledge based society and knowledge economy deeply influences the content of *globalization* processes and the effect on a situation in the modern world.

The processes of the creation of the knowledge based society and knowledge economy are perceived and assessed as an *essential worldwide transformation*, which determines a number of *breakings and sallies*, important to all the humankind.

There are very different theories and theoretical models of knowledge based society and knowledge economy creation processes. As an perspective model could be defined the *synergy effects oriented model* of the knowledge based society and knowledge economy creation processes.

The main idea of the *synergy effects oriented model* is, that the main precondition for the creation and development of the knowledge based society and knowledge economy is an active formation of various *synergy effects* in all spheres of political, social and economic life, in the culture, in all sectors of scientific and technological progress.

The two types of the ways for synergy effects formation could be defined as especially effective ways to creating the knowledge based society and knowledge economy:

- multifunctional institutional interaction as the creative connecting processes oriented to the active formation of various synergy effects;
- internationalization of the scientific and technological progress as the integration and synthesis processes connecting various technological and economic cultures and different experiences, as well as the processes oriented to the active formation of various synergy effects.

The role of the multifunctional institutional interaction is aimed to accelerate and intensify scientific and technological development and build up the development of knowledge based society and knowledge economy. It is necessary to take into account those factors, which reflect upon reciprocal interaction between different social strata and groups, different sectors of economy, organizations and institutions executing various functions. Particular importance should be given to the *systems interoperability* in scientific research, teaching, training, consultancy and practical manufacturing business.

System interoperability in scientific research, teaching, training, consultancy and practical manufacturing business is an absolutely complex phenomenon that requires solid scientific knowledge and effective theoretical solutions.

The role of the internationalization of the scientific and technological progress in the context of synergy effects formation, as well as of knowledge based society and knowledge economy creation processes is that under modern conditions scientific and technological progress, its trends, outcomes and consequences become increasingly determined by various factors, reflecting upon the expression of multiple processes of globalization and internationalization: the processes of the knowledge based society and knowledge economy creation could be defined as a form of the internationalization processes in the modern world, and the processes of the internationalization of scientific and technological progress could be defined as a priority in the system of knowledge based society and knowledge economy creation processes.

The *synergy effects oriented model* could be defined as an theoretical background for the active creation of the knowledge based society and knowledge economy, especially – for the effective institutional interaction in the system of knowledge based society and knowledge economy creation processes, as well as for the intensive internationalization of scientific and technological progress.

The object of this article is the general processes of the creation of knowledge based society and knowledge economy; the main focus is put on the multifunctional institutional interaction and the internationalization of scientific and technological progress.

Tasks of the article:

- to explore the new definitions and to describe the synergy effects as an assumption of the knowledge based society and knowledge economy creation processes;
- to explore the main ideas of the institutional interaction in the context of knowledge based society and knowledge economy creation processes;
- to describe the processes and the new trends of internationalization of the scientific and technological progress.

Knowledge based society and knowledge economy creation: the main definitions and the new theoretical approach

The *concepts* of the knowledge based society and knowledge economy as well as their creation processes are very multiple. Therefore, it is obvious, that the concepts of the knowledge based society and knowledge economy may be defined and described differently (????).

In order to substantiate appropriate definitions and descriptions, it is necessary to regard the following:

- when describing a certain *society*, the underlying attention must be paid to the highlighting of *the most important values, typical of the society itself*,
- when describing a certain *economy*, the underlying attention must be paid to the highlighting of *the most important factors of the economy growth*.

Regarding the above-mentioned attitude, it is possible to claim that it is purposeful to describe the concepts of the *knowledge based society and knowledge economy* as follows:

- the knowledge based society is the society which is characterized by the *values* of the *predominance of creativity and creative activity*, as well as the *values*, which express the *generation, spread and use of new knowledge*. In the knowledge based society, the *underlying interests* express the objectives to *create, spread and use new products of art, technical, business and other creation*, as well as *initiate, generate and implement multiple creative ideas and innovations* in all areas of life.
- the knowledge economy is the economy, for which the *underlying growth factor* is the *potential, intended for the generation, spread and use of new knowledge, as well as the activation of creativity*. The *raising and possession of abilities to create, spread and use new knowledge, ideas and innovations* in all areas of life, as well as the *incessant raise of economic efficiency with the acceleration and activation means of the science and technological progress* are the *underlying conditions* for economic growth and modernization in the knowledge economy.

The provided descriptions of the concepts reflect the *main orientations of values, which express the objectives of creativity, creation activation and new knowledge generation*, typical of the *knowledge based society*, as well as the *main features*, which characterize the significance of the *new knowledge generation, innovation and science and technological progress*, typical of the *knowledge economy*.

In order to describe society and economy reasonably, it is necessary to regard the fact, that there are *internal contradictions*, which appear in every society and in every economy system, and which operate in the same way as the *propulsion stimulating the progress of society and economy*, as well as the *cause*, which determines certain *destructive processes* that can "destroy" or destabilize both society and economy. For example, the modern "western" type democratic society and the modern market economy are typical of various *property oriented capitalistic economy contradictions*, which may be assessed as the *essential* ones. Such *property oriented capitalistic economy contradictions*, which express the *priorities of consumption*, reflect the *preconditions for progress and perfection* (especially the preconditions for the increase of competitiveness, potential growth, modernization and effectiveness), as well as the *preconditions* for various *inadequacy* to appear for future needs and challenges (it is obvious, that the expression for inadequacy needs and challenges may affect society and economy, and may determine certain "destruction" processes and condition the *needs for the essential qualitative changes*).

The highlighting of the *underlying values*, which are typical of the knowledge-based society and which express the domination of creative activity, generation, spread and use of new knowledge, allows realizing that *the essential internal contradiction* of the knowledge-based society is the *contradiction* among society members, groups, layers and variously identified management subjects, which belong to *two different categories*:

- one category is the society members, groups, layers and subjects, who become leaders, able to initiate the creation of new knowledge, ideas and innovations, participate in multiple creation actively, intensively and productively, develop creative activity, generate, spread and efficiently use the new knowledge and ideas. The society members, groups, layers and subjects, who belong to this category, generally *take over* the real *management of the society* and carry out the *functions of its development and p*rogress. What is more, the creation and spread of the new knowledge, ideas and innovations generally express the *prerogative of making management decisions, especially strategic* ones,
- the other category is the society members, groups, layers and subjects, who *lose or do not have real possibilities* to initiate the creation of new knowledge, ideas and innovations, *do not have real conditions and skills* to participate in the creation actively and intensively, to develop creative activity independently, or to generate, spread and efficiently use the new knowledge and ideas. The society members, groups, layers and subjects that belong to this category generally become just *ordinary effectors*, who have *very limited power* and only perform the *functions of effectors*, including even those areas, where huge innovation changes take place.

The above-mentioned contradiction reflects the *internal differentiation logic*, typical of the knowledge based society, when the position of different members, groups, layers or subjects of the society is determined by the *role and place when initiating, generating, spreading and using new knowledge, ideas and innovations*. Besides, the expression of the above-mentioned contradiction is *universal*: this contradiction may be perceived as appearing in the lives of separate countries and regions, and as the one, which appears in separate groups or layers of the society, as well as the one, which may appear globally in the future.

The above-mentioned contradiction reflects the meaning of those *propulsions*, which determine and will determine the *development and progress of the knowledge based society*, as well as the preconditions for various *threats and dangers* to appear, which may inevitably arise

under the conditions of the knowledge based society. It is obvious, that the *internal differentiation of the society*, which expresses *different* role and place of various society members, groups, layers and subjects when initiating, generating, spreading and using new knowledge, ideas and innovations, may show itself *in two ways*:

- as *propulsion*, which determines further development and progress of the knowledge-based society, because the *objectives to activate and effectuate creative processes*, when initiating, generating, spreading and using new knowledge, ideas and innovations, become the underlying *stimulus* of the development and progress, and the *potency* activating the processes of development and progress;
- as a precondition for new *threats and dangers* to appear, because, under the conditions, when the society differentiation exceeds certain critical limits, there inevitably appear various *tendencies of the destructive manner*, including the tendencies to integrate various means, based on the use of the newest science and technological progress results, into destructive processes.

The internal contradictions, typical of the knowledge based society, influence the processes of *knowledge economy* creation and development. The underlying conditions for economic growth and modernization, typical of the knowledge economy, which include education and possession of the abilities to create, spread and use new knowledge, ideas and innovations, as well as increase economic efficiency with the acceleration and activation means of science and technological progress, may be assessed *in two ways*:

- as the *propulsio*n, typical of the development and progress of the knowledge economy, which reflects the influence of the initiation, generation, spread and use of the new knowledge, ideas and innovations, as well as of the results of science and technological progress, on the growth and effectuation of the economy itself,
- as the *precondition* for the new threats, dangers and risks to appear, which are characteristic of the knowledge-based society and knowledge economy and which may cause various *undesirable negative results* of the knowledge economy development and progress, which appear or may appear in various sectors of economic life as well as in various areas of the society's life and development in general.

Besides, the perception of the importance of internal contradictions, typical of the knowledge based society and knowledge economy, determines the necessity and needs to analyze and assess the creation, development and progress phenomena of the knowledge based society and knowledge economy, in the context of the ideas and attitudes of the *sustainable development*. Namely, the observance of the sustainable development attitudes and the objectives to implement the ideals of the sustainable development create real preconditions to develop the knowledge based society and to create modern knowledge economy single-mindedly and efficiently.

Synergy effects in the context of knowledge based society and knowledge economy creation processes: scientific and technological progress and institutional interaction

An essential precondition for the development of science and technology advancement and intensification of the knowledge economy is building up conditions to *fully enhance the interaction* between the systems operating in different businesses, different features and orientations. Such interaction allows the search of different *synergy effects;* provides *vitalization of innovations* and *positively influences production of new quality products.*

Moreover, the strengthening of such an interaction is an *especially important requirement* to develop the sector of high-tech and enhance production of technology-oriented products. Particularly important areas of interaction are regarded in the interaction between systems where:

- *various types of intellectual products* are developed and *new knowledge is generated*,
- there is *potential for creation and accumulation of new knowledge*,
- *newly created knowledge* and *various kinds of intellectual products are completed and transformed into items or services of practical use.*

In the most common case mentioned systems as a whole include processes of *scientific research*, *teaching, training and consultancy business*, as well as *activities of practical production* (Leydesdorff, 2004; Merrill, Sedgwick, 1997; Ciegis, Ramanauskiene, Startiene, 2009; Snieska, Bruneckiene, 2009; Staskeviciute, Neverauskas, 2008; Boguslauskas, Kvedaraviciene, 2009; Rutkauskas, Miecinskiene, Stasytyte, 2008; Ciegis, Gavenauskas, Petkeviciute, Streimikiene, 2008; Uziene, 2010; Currie, 2000; Grundey, 2009.).

It can be suggested that interaction between these particular systems embracing such activities must be given a *priority attention*, since the *combination* of these activities reflect upon *the whole complex of activities*, offering a *strong commonality*. It is clear that *orientation towards commonality* of such complex of activities shows in *interconnection, of the three elements* including:

- research activities *creating new knowledge*;
- training, studies and consultancy activities, preparing *human resources* required both to *generate new knowledge*, and *dissemination* of *new knowledge and its practical use*;
- manufacturing business as an activity involving the *process transformation* of *new knowledge* into *new material products*, in which actually *new products intended for consumption* are created.

The described combination essentially represents a *single system*, whose main elements are precisely the processes *developing scientific research and intellectual resources*, processes of *human resources development and training* for *scientific and technological advancement*, as well processes *of qualitatively different manufacturing*. Moreover, such combination can be regarded as *the most important precondition* to ensure modern society's ability to accelerate scientific and technological progress and create and develop the knowledge-based economy.

Recognizing that these systems research, teaching, training, advice and practical manufacturing business need multifaceted *interaction*, a question naturally arises concerning *organizational forms* capable to implement this interoperability.

To implement interaction between research, teaching, training, consultancy and practical productive business, the international practice widely applies various organizational forms. Among these forms very popular are innovation centers, business incubators, parks of science and technology, various industrial units, techno-poles, clusters, as well as all of these organizations and networks in various combinations: dissemination of these organizational forms is done on a huge scale, and the rich opportunities to be able to invigorate scientific and technological progress and increase economic efficiency.

In the sphere of the interaction between the systems of scientific research, teaching, training, consultancy and practical manufacturing business certain *regularities* manifest themselves, through which certain *principles* characteristic to the interaction show, and *trends* of development form as a consequence of such practice of integration.

Interaction between the systems of research, teaching, training, consultancy and practical manufacturing business represent a very complex area in which various *principles* are implemented and a lot of different *trends* emerge.

In this area, among the most important principles these are to be considered:

- *the principle of orientation towards synergy effects*, which expresses the fact that the *mission of the interaction between different systems* is the *synergy effects*, allowing preconditions for qualitatively new results;
- *the principle of pursuing a new quality*, expressing the fact that as a result of the interaction between various systems, new quality result must be obtained;
- *the principle of harmony and coherence*, expressing the need to ensure that *inter-operable systems development, expansion, and changes within those the systems themselves* change in a *harmonious* and *coherent* way;
- *the principle of the priority of common interests*, expressing the attitude that, despite the fact that interacting entities may have *diverse interests*, *the most important* and *priority principles* are considered to be *common interests*;
- *the innovation principle*, expressing orientation of the interaction towards *innovation promotion and invigoration*;
- *the principle of systems and integrity*, expressing the fact that the interacting systems and entities comprise a certain *complex* which has sufficient capabilities and skills needed to *complete ready-made new quality products*.

It is clear that among the *principles* manifesting within the systems of interaction in research, teaching, training, consultancy and practical manufacturing business other principles can be mentioned albeit the most important principles should be considered those mentioned earlier.

In the sphere of the systems of interaction of research, teaching, training, consultancy and practical manufacturing business, some *multifaceted* and *somewhat contradictory trends* occur.

Among general trends as very significant the following ones can be identified:

- *consolidation trend* of the organizations, individuals and other entities operating in different activities, solving problems of the socio-economic development and scientific and technological progress, problems: this tendency expresses convergence of both the *efforts* of different entities, as well as *the accumulated potential* achieved in the various systems when seeking common results;
- the trend expressing the growing *orientation* of the research and teaching and educational process towards new needs of manufacturing business: this trend indicates that both the research content, and training, studies and consultancy processes are increasingly driven towards the priorities of manufacturing business development;
- the trend indicating the growing inclusion and activeness of industrial and business entities in development, modernization and the use of both *potential of the systems of scientific research, training, studies, and consultancy*, and consecutive involvement of human resources acting within those systems into the interaction of these systems with various business systems;
- the trend, expressing the *tendency to instigate sustainable development*, provided that by measures of the interaction of different systems between interacting systems, *harmony* is ensured both within *each system* and the *environment*;
- the trend, expressing the *tendency to intensify international relations*, since in the situation of scientific and technological progress and industrial development in business the need for a growing focus on the internationalization processes and activities in international markets inevitably emerge.

What is more, it is to be said that in the sphere of interaction among the systems of the research, teaching, training, consultancy and practical manufacturing business some *inconsistent trends* show. Among these trends *fairly specific trends* can be considered as extremely important and can be called *the tendencies of imitation of increasing scientific and technological progress*: the essence of these trends is that the idea of interaction between scientific research, teaching, training, consultancy and practical productive business sometimes turns into a *distorted* shape or ineffective form, and the interaction itself is not sufficient to actually succeed in the progress of science and technology.

Among the tendencies of imitation of increasing scientific and technological progress some of the characteristic trends can be observed:

- the trend that manifests itself in the fact that directions, shapes and real contents of the interaction between systems of parties participating in scientific and technological progress sometimes demonstrate *inadequacy* to actual needs, and contradict to declared public interests (the essence of this trend is that the interaction between the different operational entities actually becomes a "shelter" to create inefficient organizations, develop inefficient communication and maintain inefficient use of the

resources designed for scientific and technological progress),

- the trend, expressing the lack of *harmony* and *compatibility* in organizing and development of joint activities of the participants of scientific and technological progress;
- the trend, expressing the tendency to *artificially stress* the *importance* of the specific "external" manifestations of interaction between various actors involved in scientific and technological progress, focusing on the formal priority of such interactions and the image of interaction.

Trends *in simulation* listed earlier at the same time reflect some of the *problems* that actually occur and manifest in various chains of acceleration and activation of scientific and technological progress.

To sum up these statements, it may be noted that the needs for efficient cooperation between the systems of scientific research, teaching, training, consultancy and practical production prove to exist in all spheres of modern society and its socio-economic life. Targeted response to those needs is an important precondition to accelerate and intensify scientific and technological progress and create the knowledge economy in various countries (Boldrin, Canova, 2001; Hayo, Seifert, 2003; Perraton, 2001, Redding, Venables, 2004; Ciegis, Gineitiene, 2008; Dicken, 1998; Zavadskas, Antucheviciene, 2006; Platje, 2008).

Internationalization processes and the knowledge based society and knowledge economy creation: state policies in science and technology

Circumstances determined by internationalization processes manifest in the field of scientific and technological progress. Under modern conditions, scientific and technological progress, its trends, outcomes and consequences become increasingly determined by various factors, reflecting upon the expression of multiple processes of globalization and internationalization and the effects on all spheres of public life. It is clear that these circumstances should be regarded as particularly important even in the cases where by the means of scientific and technological progress a goal to consecutively and effectively manage the issues arising in the course of globalization and internationalization and manifesting in various spheres of life is sought, and in the cases when the new opportunities for scientific and technological progress and acceleration are designed to be applied, resulting from globalization and internationalization (McNally, 1999; Ciegis, Ramanauskiene, Martinkus, 2009; Garrett, Mitchell, 2001; Olsen, Osmundsen, 2003; Parker, 1998).

Among the circumstances affecting the development of scientific and technological progress, determined by the speed and magnitude of globalization and internationalization processes, the following ones are particularly noted: the emergence of new circumstances, greatly influencing the scientific and technological progress manifest. Among the mentioned ones those of major importance can be considered:

- scientific and technological development and progress activation and acceleration are to respond to those challenges and problems that occur and require international solutions: modern society's efforts to address the actual number of its current humanitarian social, political, economic, ecological, technological issues, as well such issues as safety, health, cultural and other problems inevitably require both consolidation of the international experience of scientific and technological progress potential, and development of international cooperation in various scientific and technological fields,
- the essential precondition for the activation and the actual development of science and technology is a comprehensive promotion of search for synergistic effects, including the intensification of the use of experiences gained by international experience, cross-cultural interaction, as well as the activation of international networking maintained in a variety of forms: namely, the comprehension of the importance of synergetic effects requires consideration of the various factors and priorities expressing internationalism as of key importance,
- in the context of modern society characterized by the models of openness, democracy and implementation of open market economy, processes of accelerated spread of the newly generated knowledge and new technologies in international spaces naturally show: the intensification of this spread in the international space is determined by both general processes of intensification of international communication, economic growth and the acceleration of international exchange, as well as possibilities determined by the development of modern information and telecommunication technologies,
- the processes of scientific and technological progress are increasingly affected by the growing and intensifying international migration, and increasing orientation towards the international mobility embracing widening numbers of population: particularly, mutual interaction and dependency of the processes of internationalization of the growing of labor markets, and various business activities, and processes of internationalization of scientific and technological progress should be noted,
- various actors operating internationally are increasingly involved in the processes of generation and dissemination of new knowledge and creation and implementation of new technologies, including various international organizations, multinational corporations and their networks, institutions designing to support and disseminate scientific, training and innovation based institutions acting internationally, as well as other subjects of both business and public sector: participation of actors operating at international level, and the efficiency of their activities in the development of science and technology should be considered not only as extremely meaningful, but also as one of the major factors that determines the consecutiveness, contents, results and consequences of the advancement of science and technologies,
- the inclinations towards the generation of the new scientific knowledge, the development and implementation of new technologies, as well as towards innovation are increasingly seen as extremely important elements

characteristic to universal mass culture spreading internationally: these tendencies reflect upon international spread of new values typical to modern society.

The given circumstances in various forms show in all spheres of scientific and technological progress and on the ever-expanding level influence the life of modern society, as well as social, political, and economic development, added by culture and environmental change. At the same time, this means that these circumstances must be considered when managerial and other means designed for the scientific and technological progress development and implementation, as well as contemporary public policy: what is more, the issues of the development and implementation of state policies on science and technology progress as particularly relevant to modern situation require a more detailed discussion.

Contemporary challenges to public policy in the sphere of scientific and technological progress, within the context driven by the circumstances globalization and internationalization processes.

The role of the state in the sphere of scientific and technological progress is exceptionally important, especially given that the actual scientific and technological progress requires consolidation of all society, consolidation of the potential accrued in various stages of public life and coordination and consecutive orientations of the processes taking place in various manifestations of the societal life and activities: only the state is able to be the entity of efficient management capable activating the actual scientific and technological progress in society as a whole.

In its turn, the state policy towards scientific and technological progress must have some complexity and must be geared to the contemporary challenges of globalization and internationalization.

The policy designed for the activation and acceleration of scientific and technological progress, which could adequately take into account the current context of globalization and internationalization, three main areas should be covered:

- policy of targeted activation of imports of new knowledge and new technology;
- policy of targeted activation of export of new knowledge and new technologies;
- policy focused on the fact that by generating the new knowledge and new technology development and implementation the country's public internal needs of socio-economic development, culture and progress in general, including - local business systems needs – are met.

These three areas as a whole reflect upon the orientation of the policy designed for scientific and technological progress towards the implementation of provisions and the ideas of sustainable development: these three areas are inseparable from one another, greatly influencing each other and complementary. These three areas are inseparable one from another, greatly influence and complement each other.

State policy in the development of import in the sphere of scientific and technological progress must possess complexity. This policy must be focused on the fact that:

- all the spheres of country's public life must seek provision and possession of the latest scientific knowledge and technology that in the world's practice manifest or might occur as highly innovative and promising;
- new scientific knowledge and technologies must be used efficiently, so that the use of such knowledge and technology was able to create real prerequisites for further progress in science and technology, as well as the social, political, economic and cultural development of a particular country.

Development of import in the sphere of scientific and technological progress is a very broad and multi-faceted activity. For this reason, public policy development on imports must necessarily include a lot of different directions, which are regarded as the most important:

- in all spheres and activities of life the development of human resources aimed at continuous efforts to seek opportunities in their country and their field of activity to widely use the newest scientific knowledge and technology gained in international practice: by doing this human resources must be focused on the consecutive import of new scientific knowledge and the development of skills to integrate into the space of international scientific and technological progress (in this case, integration into the international scientific and technological progress space is understood as gathering, exploration and practical application of already generated new and emerging science and technology in the international practice: readiness of human resources to import current scientific knowledge and technologies and apply them in their activities nationally, at the same time is a prerequisite for the development of actual integration into the space of international scientific and technological progress, while modernizing human resources and society in general);
- gathering and spreading of both new scientific knowledge and technology, and information about the latest scientific knowledge and technologies through various systems of education, training, research, consulting, information systems for public or its individual groups and layers, as well as through other supplying systems for public development and progress;
- targeted search, acquisition, and adaptation to develop and modernize specific areas of life and sectors requiring the most recent scientific knowledge and technologies with regards to various features, occurring in the country, adoption of the science and technology either to develop brand-new sectors or radically update and fully modernize the formerly prevailing or existing sectors;
- taking upon social, political, legal, cultural, economic, technological, informational assumptions required for the import of new scientific knowledge and technologies, as well as the creation and spread of a broad and extensive infrastructure for a focused and efficient use of the imported new knowledge and technologies;
- development and practical use of means and systems of marketing and public relations required for consequent import of knowledge and technology;

- development and implementation of the measures for intellectual property protection designed for the import of science and technology.

Thus, the complex activities of both the aforementioned, as well as in other directions can be perceived as import of science and technology, with the focus on priorities of public life and its modernization, it can be said that the public policy while developing import in the field of scientific and technological progress generally must be immediately directed towards revitalization and promotion of this activity.

State policy in the development of export in the field of scientific and technological progress should be focused on the fact that:

- accumulated human resource potential, as well as potential of socio-economic development and scientific and technological progress in general should be increasingly focused on development and export of new scientific knowledge and technologies responding to the conditions of public interest,
- development of the export of new scientific knowledge and technologies must be seen as a priority factor for country's growth of economic well-being, security and social comfort,
- development of the export of new scientific knowledge and technologies should promote the potential of creativity and innovativeness of the whole society, as well as the abilities to fully integrate into the multiple international spaces.

The concept of the export development of scientific and technological progress, along with the similar idea of import development can be viewed in a wide and multiple ways. At the same it is advisable to interpret that public policy while developing export of science and technology must include different and complementary directions:

- targeted education of human resources available in all spheres of life, with special attention to both the scientific and technological progress, representing priority spread and consolidation of values, as well as new knowledge generation, innovation, initiation and development of new technologies necessary for capacity building in creativity, innovation and proactive skills, as well as providing and disseminating theoretical and practical knowledge of various spheres of scientific and technological progress: measures designed to cover human resources development should embrace all chains of systems in education, training, education, skills development, as well as personnel management,
- development and implementation of systems necessary to diagnose and predict already highlighted internationally and prospective needs for new scientific knowledge and technologies: such systems of the diagnostics and prognosis are needed to be able to focus the processes of creating and export of new scientific knowledge and technological development to consequently orientate towards the needs fulfillment in particular international spaces,
- development and implementation of systems to ensure that the country's developed scientific and technological progress has the potential with their capabilities, structure and profile to be adequate to the needs and opportunities to develop export of already established and prospective science and technology: in general, scientific and technological potential of the country must be developed in accordance with the priorities of the activation of export of scientific knowledge and technologies,
- creation of favorable political assumptions (especially – in foreign policy), as well as setting up of favorable legal, economic, informational and other assumptions required for export activation of emerging science and technology, together with the creation of a broad and extensive infrastructure for a focused and efficient development of export,
- the development of export-oriented systems of marketing and public relations for the development and practical use of export in science and technology,
- implementation of the investment means needed for the development of export-oriented science and technology, as well as purposeful development and use of management systems,
- design and implementation of protection measures for intellectual property for the development of science and technology for export,
- preparation of conditions so that the export of emerging science and technology would gradually increase the share of the gross national export structure: there must be efforts seen to prioritize the science and technology exports to the country's essential social and economic development.

It is clear that the export development in the area of scientific and technological progress is exceptionally important to the modernization of the country and society to fully improve the quality of life.

It should be noted that public policy by the development both imports and exports in the sphere of scientific and technological progress should be directly linked to the orientation of progress in science and technology with the local needs of the country. Scientific and technological progress measures must pursue parallel activation of:

- generation of new knowledge and new technologies via the tools of local capacity building and development, while promoting country's public creativity, innovativeness, and intellectual development,
- practical application of new knowledge and technology directly within the country, while promoting local capacity-oriented entry in the public process of modernization.

At the same time it should be noted that in the contemporary circumstances of globalization and internationalization state policies on scientific and technological progress should be increasingly oriented towards the reflection of various circumstances of internationalization and international cooperation. Even in the cases when scientific and technological progress is a means to address local problems, these measures during the preparation and implementation take an increasingly larger scale taking into account various circumstances of internationalization and international cooperation. For this reason it can be argued that the most important public policies in terms of scientific and technological progress in

modern reality import and export growth of new knowledge and new technology comes along.

In the conditions of the growing role of internationalization and international cooperation, special attention must be given to the process of mutual interaction among various actors, institutions and organizations directly participating in the science and technological progress, as well as various international networking. It can be argued that the improvement of interaction between various actors and the international development of the network society are exceptionally important promoters of scientific and technological progress accelerating the activation of factors to be considered is the development and implementation of government policy in the field of scientific and technological progress.

The above statements as a whole characterize both contemporary public policy challenges, and various opportunities to accelerate and intensify scientific and technological progress.

Conclusions

1. The knowledge based society and knowledge economy creation is an important priority of social, economic and technological changes and development processes, especially - in the European Union. The processes of the creation of knowledge based society and generating knowledge economy and its further development should be understood as *the undivided unity:*

- the processes of the creation of knowledge based society and generating knowledge economy and its further development should be perceived as relevant to *all* spheres of life – meaning social, economic, and political life, culture, advancement of science and technologies and their advancement, interaction with nature in general and environment in particular;
- the processes of the creation of knowledge based society and generating knowledge economy and its further development should be comprehended as the ones providing *economic preconditions* for the modernization of the society and refinement of its life in accordance with the standards, norms and values of knowledge based society;
- the processes of the creation of knowledge based society and generating knowledge economy and its further development should be interpreted as multi-dimensional and extremely complex and uninterrupted process which manifests itself in *cyclical changes and leaps towards higher quality standards, the complex approach* towards knowledge based society and generating knowledge economy and its further development should be implemented in *all* stages of scientific research, studies and practical activities, including the prioritizing of various programmes on multi- and cross-disciplinary research and studies, as well as strategic solutions of a complex character in various stages.

2. The knowledge based society and knowledge economy creation processes could be analyzed in the context of *the ideas of synergy effects*: the processes of the creation and development of the knowledge based society and knowledge economy may be attributed to the category of *global transformation and synergy effects oriented development processes.* By creating knowledge based society and generating knowledge economy and its further development, *harmonization* should be sought in the following ways*:*

- in the fields of various social, economic, political development, culture, advancement in science and technologies, interplay with nature and other fields;
- in the environment of changes in various countries, regions or otherwise geographically or regionally defined systems;
- in changes occurring in various layers of society.

3. Creation and modernization of the knowledge based society and knowledge economy are *very complicated processes, oriented to the formation of a new quality society and qualitatively new lifestyle*. Moreover, these processes may be described as *"twice" as complicated*, because they win distinction by orientations to the *pursuit of new quality in two aspects*:

- the knowledge based society and knowledge economy, compared to "traditional" society and economy, are in all cases described as qualitatively new;
- creation and development of the knowledge-based society and knowledge economy takes place under the conditions of the *global changes*, which means that *qualitative changes* take place *in all global space*, the essence of those changes is the creation and spread of the knowledge based society and knowledge economy.

4. Analyzing the creation possibilities and perspectives of the knowledge-based society and knowledge economy, it is purposeful to refer to the *universal principle of the "new quality creation"*. This principle expresses the abstraction and use of *synergetic effect* and shows, that *qualitative changes* always require actions and means, necessary to *merge elements of different origin into a common system*.

A new quality is always formed *as a result of conjugation: conjugation processes* may be very different and in the most general case, they may be attributed to *two types integration processes* and *synthesis processes*. Besides the *universal principle of the "new quality creation"*, other principles are also implemented, including a very important *universal innovativeness principle*, which allows perceiving the *initiation, generation, spread, use and further renewal logic* of *innovation*s and *new knowledge* in general. The essence of this logic is that the processes of initiation, generation, spread, use and further renewal of innovations and new knowledge in general are treated as expression of certain *cycles* and when perceiving that *two* preconditions of these processes exist:

- generation, spread and use cycles of any innovations, new ideas and new knowledge is started by a certain subject, performing *the function of a new idea or innovation generation*, which has to dispose of *creative potential*, necessary for the generation of a new idea or innovation, has to be able to use this creative potential properly and tangibly *generate* appropriate innovations, new ideas and knowledge. It must be noted, that in the generation course of innovations, new ideas and knowledge, *opposition* is usually expressed for the

established attitudes, traditions, perceptions, models and stereotypes, therefore the *subject, carrying out the functions of generation*, may be assessed as having the *opponent* abilities,

- any innovations, new ideas or new knowledge may be tangibly spread and used in practice only in those cases when a certain *critical mass*, necessary to "accept" and assimilate *newly generated innovations, ideas and new knowledge*, is formed in an appropriate cultural, social, economic, political environment. It is also possible to claim that *critical mass* shows the environment's ability to tolerate appropriate innovations as well as initiate and activate *change processes* and stimulate the *adaptation to changes* based on *self-regulation*.

5. The processes of the creation of knowledge based society and generating knowledge economy and its further development should be analyzed and assessed in the context of *the processes of globalization and internationalization*. The main priorities for the creation of knowledge based society and generating knowledge economy in the context of globalization and internationalization could be defined :

- development of the institutional interaction in the systems of a scientific and technological progress, including - the internationalization of an institutional interaction;

- internationalization oriented state policies in science and technology.

6. New priorities for *the development of international cooperation* and *priorities for improving international management* show:

- development of international cooperation and improvement of international management should be based upon the promotion and practical application of the *ideas, patterns and technologies of networking*,

- within international management there should dominate the key trend oriented towards the activization and promotion of *creativity, innovation and entrepreneurship*, as well as towards the implementation of the ideas of *sustainable development* and *harmony*.

In all chains of human resource training there should be implemented the means oriented towards the adequate response to the emerging needs to consecutively solve the problems of sustainable development, elaboration of international management and activization of international cooperation manifesting them in the context of the creation of knowledge based society and generating knowledge economy and its further development.

References

Boguslauskas, V., & Kvedaraviciene, G. (2009). Difficulties in identifying company's core competencies and core processes. *Inzinerine Ekonomika-Engineering Economics*(2), 75-81.

Boldrin, M., Canova, F. (2001). Inequality and convergence in Europe's regions: reconsidering European regional policies, *Economic Policy* 16(32): 205-253. doi: 10.1111/1468-0327.00074.

Ciegis, R., Gavenauskas, A., Petkeviciute, N., & Streimikiene, D. (2008). Ethical values and sustainable development: Lithuanian experience in the context of globalisation. *Technological and Economic Development of Economy*,14(1), 29-37.

Ciegis, R., & Gineitiene, D. (2008). Participatory aspects of strategic sustainable development planning in local communities: Experience of Lithuania. *Technological and Economic Development of Economy*, 14(2), 107-117. doi: doi 10.3846/1392-8619.2008.14.107-117.

Ciegis, R., Ramanauskiene, J., Martinkus, B. (2009). The concept of sustainable development and its use for sustainability Scenarios. *Inzinerine Ekonomika-Engineering Economics*(2), 28-37.

Ciegis, R., Ramanauskiene, J., & Startiene, G. (2009). Theoretical reasoning of the use of indicators and indices for sustainable development assessment. *Inzinerine Ekonomika-Engineering Economics*(3), 33-40.

Cohendet, P., & Stojak, L. (2005). The digital divide in Europe. The economic and social issues related to "knowledge-based Europe. *Futuribles: Analyse et Prospective* 305: 5-28. doi: 10.1051/futur:20053055

Currie, W. (2000). *The Global Information Society*, Chichester, John Wiley, 288.

David, P. A.; Foray, D. 2002. An introduction to the economy of the knowledge society. *International Social Science Journal*, 171, 9-25. doi: 10.1111/1468-2451.00355

Dicken, P. (1998). *Global Shift: Transforming the World Economy*. London, Sage Publications; A. Paul Chapman Publishing, 512.

Ein-Dor, P., Myers, M., & Raman, K. S. (2004). IT industry development and the knowledge economy: A four country study. *Journal of Global Information Management*, 12(4), 23-49.

Farnsworth, K. (2005). Promoting business-centred welfare: international and European business perspectives on social policy. *Journal of European Social Policy* 15(1), 65-80. doi: 10.1177/0958928705049163

Garrett, G., Mitchell, D. (2001). Globalisation, government, spending and taxation in OECD countries. *European Journal of Political Research* 39(3), 145-177. doi: 10.1023/A:1011043120145

Goeransson, B., & Soederberg, J. (2005). Long waves and information technologies – On the transition towards the information society. *Technovation* 25(3), 203-211.

Grace, A., & Butler, T. (2005). Beyond knowledge management: Introducing learning management systems. *Journal of Cases on Information Technology*, 7(1), 53-70.

Grundey, D. (2009). Sustainable development research advances. *Transformations in Business and Economics*, 8(2), 169-172.

Hayo, B., & Seifert, W. (2003). Subjective economic well-being in Eastern Europe. *Journal of Economic Psychology* 24(3), 329-348. doi: 10.1016/S0167-4870(02)00173-3

Hunt, S. D. (2000). *A general theory of competition: resources, competences, productivity. Economic Growth*. London: Sage Publications, 385-393. doi: 10.1023/A:1027353307279

Huseman, R. C., & Godman, J. P. (1999). *Leading with Knowledge: The Nature of Competition in 21 st. Century*. London: Sage Publications. 272.

Kaziliunas, A. (2008). Problems of auditing using quality management systems for sustainable development of organizations. *Technological and Economic Development of Economy*, 14(1), 64-75.

Leydesdorff, L. (2004). The university – industry knowledge relationship: analysing patents and the science base of technologies. *Journal of the American Society for Information Science and Technology*, 55(11), 991-1001. doi: 10.1002/asi.20045

McNally, R. (1999). *The comprehensive World Atlas.* Stamford: Longmeadow Press, 224.

Melnikas, B. (1990). *Scientific and technological progress and investment processes: planning, management, ecology (Mokslo bei technologiju pazanga ir investiciju procesai: planavimas, valdymas, ekologija)*. Vilnius: Liaudies ukio vadovaujančiuju darbuotoju ir specialistu kvalifikacijos kelimo institutas, 281. (in Russian – rusu k.).

Melnikas, B. (1997). The integrations problems of the Baltic States: possibilities for the formation of a unified technological, economic and social space. *East West Scientific Cooperation. Science and Technology Policy of the Baltic States and International Cooperation*. NATO ASI Series, 4, Science and Technology Policy. Dordrecht. Boston: Kluwer Academic Publisher 15, 33-51.

Melnikas, B. (1999). Probleme der integrattion der baltischen staaten in westliche strukturen. *Berichte des Bundesinstituts fuer ostwissenschaftliche und internationale Studien* 40, 42.

Melnikas, B. (2002). *Transformacijo*s. Vilnius: Vaga. 750.

Melnikas, B., & Reichelt, B. (2004). *Wirtschaft und Mentalitaet : Tendenzen der EU-Osterweiterung.* Leipzig: Leifim – Verlag. 159.

Melnikas, B. (2008). Integration processes in the Baltic region: the new form of regional transformations in the European Union. *Inzinerine Ekonomika-Engineering Economics*(5), 54-64.

Melnikas, B. (2008). The knowledge based economy in the European Union: innovations, networking and transformation strategies. *Transformations in Business and Economics*, 7(3), 170 -192.

Merrill, R. E., & Sedgwick, H. D. (1997). *The New Venture Handbook*. New York: Amacom, 256.

Munasinghe, M., Sunkel, O., & de Miguel, C. (2001). *The sustainability of long-term growth: socioeconomic and ecological perspectives*. Cheltenham: Edward Elgar Publishing. 464.

Olsen, T. E., & Osmundsen, P. (2003). Spillovers and international competition for investments. *Journal of International Economics*, 59(1), 211-238. doi:10.1016/S0022-1996(02)00086-7

Parker, B. (1998). *Globalisation and business practice: managing across boundaries*. London: Sage Publications, 672.

Platje, J. (2008). Institutional capital as a factor of sustainable development - The importance of an institutional equilibrium. *Technological and Economic Development of Economy*, 14(2), 144-150. doi: 10.3846/1392-8619.2008.14.144-150

Perraton, J. (2001). The global economy – myths and realities. *Cambridge Journal of Economics*, 25, 669-684.

Redding, S., & Venables, A. J. (2004). Economic geography and international inequality. *Journal of International Economics*, 62(1), 53-82. doi: 10.1016/j.jinteco.2003.07.001

Rutkauskas, A. V., Miecinskiene, A., & Stasytyte, V. (2008). Investment decisions modelling along sustainable development concept on financial markets. *Technological and Economic Development of Economy*, 14 (3), 417-427. doi: 10.3846/1392-8619.2008.14.417-427

Sangmon, K. (2002). A longitudinal analysis of globalisation and rationalization in international trade: social network approach. *Social Forces*, 81(2), 445-471. doi: 10.1353/sof.2003.0014

Snieska, V., & Bruneckiene, J. (2009). Measurement of Lithuanian regions by regional competitiveness index. *Inzinerine Ekonomika-Engineering Economics*(1), 45-57.

Staskeviciute, I., & Neverauskas, B. (2008). The intelligent university's conceptual model. *Inzinerine Ekonomika-Engineering Economics*(4), 53-58.

Steinmueller, W. E. (2002). Knowledge-based economies and information and communication technologies. *International Social Science Journal*, 54(171), 141-154. doi: 10.1111/1468-2451.00365

Urbanskiene, R., Zostautiene, D., & Chreptaviciene, V. (2008). The model of creation of customer relationship management (CRM). *Inzinerine Ekonomika-Engineering Economics*(3), 51-59.

Uziene, L. (2010). Model of organization‘s intellectual capital measurement. *Inzinerine Ekonomika-Engineering Economics,* 21(2), 151-159.

Zavadskas, E. K., & Antucheviciene, J. (2006). Development of an indicator model and ranking of sustainable revitalization alternatives of derelict property: a Lithuanian case study. *Sustainable Development,* 14(5), 287-299. John Willey and Sons, England, doi: 10.1002/sd.285

Borisas Melnikas

Žinių ekonomika: sinergetiniai efektai, tarpinstitucinė sąveika ir internacionalizavimo procesai

Santrauka

Straipsnyje pateikiamas naujas teorinis požiūris į žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo procesus. Pagrindinė idėja, kuri išreiškia šio teorinio požiūrio esmę –žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo procesai yra suvoktini ir nagrinėtini kaip akumuliuojantys ir parodantys įvairios kilmės sinergetinių efektų inicijavimo ir panaudojimo rezultatus.

Straipsnio tikslas – atskleisti sinergetinių efektų reikšmingumą vykstant žiniomis grindžiamos visuomenės bei žinių ekonomikos kūrimo ir plėtojimo procesams, išryškinti prioritetiškai svarbius sinergetinių efektų raiškos, inicijavimo, kūrimo ir panaudojimo atvejus.

Straipsnyje atskleistas sinergetinių efektų inicijavimo bei kūrimo vaidmuo įvairiose žiniomis grindžiamos visuomenės bei žinių ekonomikos kūrimo ir plėtojimo procesų pakopose bei grandyse. Pažymėta, kad sinergetiniai efektai atsiranda, išryškėja ir gali būti panaudoti įvairiais žiniomis grindžiamos visuomenės bei žinių ekonomikos kūrimo ir plėtojimo atvejais.

Straipsnyje pateikta, kad šiuolaikinėmis sąlygomis reikšmingi du sinergetinių efektų raiškos ir panaudojimo atvejai, būdingi žiniomis grindžiamos visuomenės bei žinių ekonomikos kūrimui ir plėtojimui: 1) sinergetiniai efektai, kurių esmė – įvairūs socialinės ekonominės raidos bei mokslo ir technologijų pažangos internacionalizavimo bei tarptautinių ryšių kūrimo ir plėtros procesai; 2) sinergetiniai efektai, kurių esmė – įvairaus pobūdžio tarpinstitucinė ir tarporganizacinė sąveika vykstant įvairių socialinės ekonominės raidos bei mokslo ir technologijų pažangos procesams, tarp jų ir internacionalizavimo procesams.

Taigi straipsnyje kaip tik ir aptariamos tos žiniomis grindžiamos visuomenės bei žinių ekonomikos kūrimo ir plėtojimo aplinkybės, kurios atspindi sinergetinių efektų inicijavimo, aktyvinimo ir panaudojimo problematiką, prioritetą teikiant dviems minėtiems atvejams: 1) įvairiems socialinės ekonominės raidos bei mokslo ir technologijų pažangos internacionalizavimo bei tarptautinių ryšių kūrimo ir plėtros procesams, taip pat šių procesų aktyvinimui; 2) įvairaus pobūdžio tarpinstitucinei ir tarporganizacinei sąveikai, ypač vykstant internacionalizavimo procesams.

Pateika, kad šiuolaikinėmis globalizacijos bei socialinės, ekonominės raidos ir mokslo bei technologijų pažangos internacionalizavimo sąlygomis išryškėja daug naujų aplinkybių ir reiškinių, kurių poveikis ir vaidmuo nepakankamai atsispindi daugumoje tradicinių požiūrių, skirtų žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo problematikai aptarti. Padaryta išvada, kad tradiciniai žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo logikos ir tendencijų suvokimai vis labiau neatitinka šiuolaikinių poreikių ir iššūkių. Šiuos suvokimus reikia iš esmės papildyti ir patikslinti.

Pažymėta, kad šiuolaikiniai požiūriai į žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimą turėtų gerokai giliau atspindėti šiuo metu pasaulyje vykstančių naujo tipo transformacijų procesų vaidmenį ir įtaką. Visų pirma – vaidmenį ir įtaką tų transformacijų, kurios rodo žiniomis grindžiamos visuomenės vertybių ir idealų pasklidimą globaliu mastu: būtent žiniomis grindžiamos visuomenės kūrimasis ir šios visuomenės vertybių ir idealų pasklidimas globalizacijos aplinkoje sąlygoja naujas transformacijas šiuolaikinėje visuomenėje bei jos gyvenime ir sudaro prielaidas, kad būtų suvokta būtinybė naujai reaguoti į šiuolaikinius iššūkius.

Atskleidžiami žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo procesų ypatumai, išryškėjantys šiuolaikinėmis globalizacijos ir socialinės ekonominės raidos, kultūros, mokslo ir technologijų pažangos internacionalizavimo sąlygomis. Formuluojami naujai suvoktini žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo principai, atskleidžiami pastaruoju metu pasireiškiantys žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo ir raidos dėsningumai.

Straipsnyje pateikta, kad plėtojant ir aktyvinant žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo procesus didelis dėmesys yra skirtinas mokslo ir technologijų pažangos internacionalizavimui, ypač valstybės politikai internacionalizuojant ir spartinant mokslo bei technologijų pažangą.

Tarp tų mokslo ir technologijų pažangai darančių įtaką aplinkybėms, kurias lemia ir vis labiau paveikia globalizacijos ir internacionalizavimo procesų sparta ir mastas, ypač pažymėtinos tokios: išryškėja naujos aplinkybės, darančios didelę įtaką mokslo ir technologijų pažangai. Tarp šių aplinkybių reikšmingos yra šios:

- aktyvinant ir spartinant mokslą ir pažangą vis labiau tenka reaguoti į tuos iššūkius ir problemas, kurios reiškiasi ir reikalauja sprendimų tarptautiniu mastu: šiuolaikinės visuomenės pastangos realiai spręsti daugybę jai aktualių humanitarinių socialinių, politinių, ekonominių, ekologinių, technologinių, taip pat saugumo, sveikatos apsaugos, kultūros ir kitų problemų neišvengiamai reikalauja tiek sutelkti tarptautiniu mastu sukauptą mokslo ir technologijų pažangos potencialą, tiek ir plėtoti tarptautinį bendradarbiavimą įvairiose mokslo ir technologijų pažangos srityse;
- esminė prielaida aktyvinti ir realiai plėtoti mokslo ir technologijų pažangą – visapusiškai skatinti sinergetinių efektų paiešką, taip pat – aktyvinti tarptautiniu mastu sukauptos patirties panaudojimą, skirtingų kultūrų sąveiką, įvairiomis formomis plėtotiną tarptautinę tinklaveiką: suvokus sinergetinių efektų svarbą įvairūs tarptautiškumą rodantys veiksniai ir prioritetai yra reikšmingi;
- įgyvendinant šiuolaikinei visuomenei būdingus atvirumo, demokratijos ir atviros rinkos ekonomikos modelius, natūraliai vyksta naujai generuojamų mokslo žinių bei naujų technologijų spartėjančio pasklidimo tarptautinėse erdvėse procesai: spartėjantį pasklidimą tarptautinėse erdvėse sąlygoja tiek bendrieji tarptautinių komunikacijų intensyvėjimo, tarptautinės ekonomikos augimo ir tarptautinių mainų aktyvėjimo procesai, tiek galimybės, kurios lemia šiuolaikinių informacinių ir telekomunikacinių technologijų plėtra;
- mokslo ir technologijų pažangos procesams vis didesnę įtaką daro didėjanti ir intensyvėjanti tarptautinė migracija ir tai, kad vis daugiau gyventojų orientuojasi į tarptautinį mobilumą: ypač pažymėtina didėjanti darbo rinkų bei įvairių verslo subjektų veiklos internacionalizavimo procesų bei mokslo ir technologijų pažangos internacionalizavimo procesų tarpusavio sąveika ir priklausomybė;
- naujų mokslo žinių kūrimo ir skleidimo bei naujų technologijų kūrimo ir įgyvendinimo procesuose vis aktyviau dalyvauja ir šiems procesams vis didesnę įtaką daro įvairūs subjektai, veikiantys tarptautiniu mastu, tarp jų įvairios tarptautinės organizacijos, tarptautinės įmonės ir jų tinklai, tarptautiniu mastu veikiančios mokslo, studijų, inovacijų palaikymo ir skleidimo institucijos, taip pat kiti tiek versle, tiek viešajame sektoriuje veikiantys subjektai: tarptautiniu mastu veikiančių subjektų dalyvavimas ir jų veiklos efektyvumas plėtojant mokslo ir technologijų pažangą yra suvoktini ne tik kaip itin reikšmingas, bet ir kaip vienas svarbiausių veiksnių, lemiančių pačios mokslo ir technologijų pažangos kryptingumą, turinį, rezultatus ir pasekmes;
- polinkiai į naujų mokslo žinių kūrimą, į naujų technologijų kūrimą ir įgyvendinimą, taip pat polinkiai į inovacijas vis labiau suvokiami kaip naujai tarptautiniu mastu sklindančiai universaliai masinei kultūrai būdingi itin reikšmingi elementai: tokie polinkiai atspindi moderniai visuomenei būdingų naujų vertybių sklaidą tarptautiniu mastu.

Šios aplinkybės įvairiomis formomis reiškiasi visose mokslo ir technologijų pažangos srityse ir daro vis didesnę įtaką šiuolaikinės visuomenės gyvenimui, socialinei, politinei, ekonominei raidai, kultūrai ir aplinkos pokyčiams. Taigi į šias aplinkybes turi būti atsižvelgiama rengiant ir įgyvendinant mokslo ir technologijų pažangai skirtas valdymo ir kitas priemones, taip pat šiuolaikinės valstybės politiką.

Straipsnyje pateiktos galimybės kryptingai aktyvinti tiek mokslo ir technologijų pažangos eksportą, tiek importą.

Valstybės vaidmuo mokslo ir technologijų pažangos srityje yra svarbus, juolab, kad reali mokslo ir technologijų pažanga reikalauja visos visuomenės pastangų, įvairiose visuomenės grandyse sukauptų galimybių stiprinimo ir skirtingose visuomenės gyvenimo bei veiklos srityse vykstančių procesų koordinavimo bei kryptingų orientacijų: tik valstybė pajėgi būti efektyviai veikiantis valdymo subjektas, galintis aktyvinti mokslo ir technologijų pažangą visos visuomenės mastu.

Savo ruožtu valstybės politika mokslo ir technologijų pažangos srityje turi pasižymėti *kompleksiškumu* ir turi būti orientuota į šiuolaikinius *globalizacijos ir internacionalizavimo iššūkius.*

Mokslo ir technologijų pažangos aktyvinimui bei spartinimui skirta politika, kuria būtų siekiama adekvačiai atsižvelgti į šiuolaikines globalizacijos ir internacionalizavimo aplinkybes, turėtų apimti *tris* pagrindines kryptis: 1) politika, kryptingai aktyvinant naujų mokslo žinių ir naujų technologijų importą; 2) politika, kryptingai aktyvinant naujų mokslo žinių ir naujų technologijų eksportą; 3) politika, orientuota į tai, kad kuriant naujas mokslo žinias, kuriant ir įgyvendinant naujas technologijas būtų tenkinami vidiniai šalies visuomenės socialinės ekonominės raidos, kultūros, apskritai pažangos poreikiai, tarp jų vietinio verslo sistemų poreikiai.

Šios trys kryptys kaip visuma atspindi tai, kad mokslo ir technologijų pažangai skirta politika orientuota į darnios plėtros nuostatų ir idėjų įgyvendinimą: šios trys kryptys yra neatskiriamos viena nuo kitos, viena kitą papildančios.

Straipsnyje atskleistos galimybės aktyvinti žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimą, tobulinant institucinę ir tarpinstitucinę sąveiką tarp įvairių mokslo ir studijų institucijų, verslo įmonių, ypač gamybinių įmonių, konsultacines funkcijas bei projektavimo ir konstravimo darbus vykdančių įmonių, įstaigų ir organizacijų: parodyta, kad institucinė ir tarpinstitucinė sąveika yra itin svarbus mokslo ir technologijų pažangos skatinimo ir kryptingo plėtojimo veiksnys.

Esminė prielaida plėtoti mokslo ir technologijų pažangą bei aktyvinti žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimą – sudaryti sąlygas, kad būtų visapusiškai stiprinama sąveika tarp skirtinga veikla, skirtingomis funkcijomis ir orientacijomis pasižyminčių sistemų. Stiprinant tokią sąveiką, kryptingai siekiama įvairių sinergetinių efektų, užtikrinamas inovacijų aktyvinimas ir daroma teigiamą įtaką kokybiškai naujų produktų sukūrimui.

Tokios sąveikos stiprinimas yra išskirtinai svarbi prielaida plėtoti aukštųjų technologijų sektorių ir didinti technologiškai orientuotų produktų gamybą.

Ypač svarbi sąveikos stiprinimo sritis yra sąveika tarp sistemų, kuriose: kuriami įvairaus pobūdžio intelektiniai produktai ir generuojamos naujos žinios, kuriamas ir kaupiamas naujų žinių kūrimo potencialas, naujai sukurtos žinios ir įvairaus pobūdžio intelektiniai produktai materializuojami ir paverčiami praktiškai naudoti skirtais daiktais ar paslaugomis.

Bendriausiu atveju išvardytų sistemų visuma apima mokslinius tyrimus, mokymo, studijų ir konsultacinės veiklos procesus, taip pat praktinio pobūdžio gamybinę veiklą. Galima teigti, kad būtent tokias veiklas apimančių sistemų sąveikai turi būti teikiamas didžiausias dėmesys, nes šių veiklų kombinacija atspindi į bendrą visumą sujungiamų veiklų kompleksą, pasižymintį ryškiu bendrumu. Minėtos veiklų kombinacijos orientavimą į bendrumą parodo tai, kad sujungiami trys pradiniai elementai: moksliniai tyrimai kaip veiklą, kurioje kuriamos naujos žinios; mokymas, studijos ir konsultacinė veikla, kurioje parengiami žmogiškieji ištekliai, reikalingi tiek naujoms žinios kurti, tiek naujoms žinioms skleisti ir praktiškai jas panaudoti, gamybinio pobūdžio verslas kaip veikla, kurioje naujos žinios keičiasi į naujus materialinius produktus ir kurioje iš esmės ir yra sukuriami nauji naudoti skirti produktai.

Ši kombinacija iš esmės atspindi bendrą sistemą, kurios pagrindiniai elementai kaip tik ir yra mokslinių tyrimų ir naujų intelektinių išteklių kūrimo procesai, žmogiškųjų išteklių ugdymo ir jų parengimo mokslo ir technologijų pažangai procesai, tai pat kokybiškai naujos gamybos procesai. Tokia kombinacija gali būti traktuojama kaip svarbiausia sąlyga, užtikrinanti šiuolaikinės visuomenės gebėjimus spartinti mokslo ir technologijų pažangą ir kurti bei plėtoti žiniomis grindžiamą visuomenę ir žinių ekonomiką.

Taigi straipsnyje yra išryškinta sinergetinių efektų svarba ir atskleisti du itin reikšmingi sinergetinių efektų raiškos, inicijavimo ir panaudojimo žiniomis grindžiamos visuomenės bei žinių ekonomikos kūrimo ir plėtojimo aplinkybėmis atvejai, kai prioritetai teikiami įvairiems socialinės ekonominės raidos bei mokslo ir technologijų pažangos internacionalizavimo bei tarptautinių ryšių kūrimo ir plėtros procesams, šių procesų aktyvinimui, taip pat įvairaus pobūdžio tarpinstitucinei ir tarporganizacinei sąveikai, ypač vykstant internacionalizavimo procesams.

Nagrinėjant sinergetinių efektų raišką žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo procesų kontekste, pagrindinis dėmesys skiriamas integracijos ir sintezės kaip jungimosi procesų logikai atskleisti.

Straipsnyje išdėstytas teorinis požiūris gali būti gana plačiai taikomas nagrinėjant įvairius žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo reiškinius.

Raktažodžiai: *žiniomis grindžiama visuomenė, žinių ekonomika, žiniomis grindžiamos visuomenės ir žinių ekonomikos kūrimo bei raidos dėsningumai, sinergetiniai efektai, institucinė sąveika, internacionalizavimo procesai.*

The article has been reviewed.

Received in February, 2011; accepted in October, 2011.