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INTELLECTUALISATION PROCESSES IN THE CONTEXT OF EUROPEAN INTEGRATION: NEEDS AND PRIORITIES FOR THE DEVELOPMENT OF THE HIGH TECHNOLOGIES SECTOR

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Abstract. This theoretical article analyses problems and development processes typical for the high technologies sector in the European Union in the context of contemporary challenges of globalisation, European integration, creation of the knowledge-based society and knowledge economy, as well as in the context of intellectualisation processes in the social and economic life in general.

The article focuses on the needs and priorities of creation and further development and modernisation of high technologies sector in the European Union in the context of intellectualisation processes of social and economic life, as well as on the theoretical concept that could be used as a theoretical basis for strategic solutions and decisions oriented towards the innovative development and modernisation of high technologies sector in the European Union.

The processes of creation and further development of high technologies sector are defined as an especially important social, economic and technological transformation in the contemporary society and in the social and economic life of the European Union. The trends of creation of the high technologies sector in the context of enlargement of the European Union are described and analysed. The article discusses some new unconventional ideas and models of possible economic development in the context of intellectualisation processes in general, as well as of the development of high technologies sector. It analyses the processes of development of integral high technologies oriented towards European economic, social and cultural space.

The needs and priorities of creation and further development of the high technologies sector in the European Union, as well as the main challenges for the creation, development and further modernisation of the high technologies sector in the context of globalisation, European integration and creation of the knowledge-based society and knowledge economy are discussed in detail. The structure and the main spheres and parts of the modern high technologies sector in the European Union are characterised.

The following features of social, economic and technological development, including the processes of development of the high technologies sector, under the conditions of the en-

largement of the European Union and the processes of globalisation deserve particular attention: intensive diversification of traditional economic structures, profound changes in all sectors of national economic systems as well as in the economy of the European Union in general. The rise of the role of high technologies sector should be defined as an especially important factor of contemporary social, economic and technological development. It must be noted that there are many possibilities to implement new unconventional ideas of intensive social, economic and technological development, which could be very successful in the European Union in the context of contemporary challenges of the development and modernisation of the high technologies sector. It should be emphasised that the implementation of such ideas is very important for the development of the high technologies sector as well as in influencing positive social, economic and technological changes in the European Union in general.

JEL classification: A10, F01, F20, F50, F59, O10, O30, O32, O39, Q59.

Keywords: intellectualisation processes, high technologies sector, European Union, European integration, economic development.

Reikšminiai žodžiai: intelektualizavimo procesai, aukštųjų technologijų sektorius, Europos Sąjunga, Europos integracija, ekonominė raida.

Introduction

The future of the European Union lies in the *intellectualisation* and *creation of the knowledge-based society and knowledge economy*. It is obvious that *the high technologies sector* could be defined as *a key component of the knowledge-based society and knowledge economy*, as well as in the context of *intellectualisation processes* covering *all spheres of social and economic life of the contemporary society in the European Union*. This means that intensive development and further modernisation of *the high technologies sector* should be defined as the most important precondition for the *successful intellectualisation*, also the *creation and development of the knowledge-based society and knowledge economy*, as also as an especially important priority of social, economic and technological development in the European Union in general.

Of course, the key issues that require *strategic decisions* on the future of the European Union are the *creation, development and further modernisation* of *the effective high technologies sector.*

The essence of those issues could be revealed as follows:

- *What* should the *high technologies sector* be like in the future in the European Union?
- *How* should the *high technologies sector* be created, developed and modernised in the European Union?

In order to find answers to those questions, it is necessary to elaborate and implement appropriate *strategies for the creation, development and modernisation of the high technologies sector*.

This theoretical article analyses a new approach towards the way that *long-term strategies* designed to create, develop and modernise the *high technologies sector* in the European Union should be prepared. This approach is a result of *scientific research*, the

object of which has been the *development and modernisation of the high technologies sector* as well as *the creation of the knowledge-based society and knowledge economy in the contemporary situation of the enlargement of the European Union in general.*

The objective of the completed research has been proving the fact that the *key priorities* for the *development and modernisation of the high technologies sector* as well as for the intellectualisation and *creation of the knowledge-based society and knowledge economy in general* are *the urge for technological advancement and enhancement of compatibility and productivity* by using such opportunities as *specialisation of national and regional economies, creation of clusters and their networks,* as well as *the development of the so-called economic "oases" and hyper-clusters in the entire economic space of the European Union.*

The main *result* of the completed research is the concept of *strategies oriented towards the development and modernisation of the high technologies sector,* the basis for which is the *universal principle of 'creation of a new technological quality'*, as well as implementation of these strategies into practical activities for the creation of the knowledge-based society and knowledge economy in the European Union.

The completed research had the following key *tasks*:

- demonstrate the fact that the *high technologies sector* should be created, developed and modernised in the European Union according to the *universal principle of creation of a new technological quality,*
- reveal the essence of *rational specialisation of national and regional high technologies sectors*,
- Prove the necessity to create and apply *strategies oriented towards the development and modernisation of the high technologies sector.*

These tasks have been of a *priority* in the context of the processes of *intellectualisation* and *creation of a modern knowledge-based society and knowledge economy in the European Union*.

1. High Technologies Sector in the Context of Intellectualisation Processes and Creation of a Knowledge-Based Society and Knowledge Economy in the European Union: Development Needs and Priorities

The problems, processes and priorities of the high technologies sector development and its modernisation in the European Union should be analysed in the context of the processes of globalisation, European integration and development and enlargement of the European Union in general, as well as in the context of the processes of creation of a knowledge-based society and knowledge economy: the processes of globalisation, European integration and the development and enlargement of the European Union, and the processes of creation of the knowledge-based society and knowledge economy should be defined as *the environment* of the high technologies sector development and modernisation in the European Union (Ambros, B., Schlegelmilch, B.B. 2009; Brakman, S., Garretsen, H., Marrewijk, C.van, Witteloostuijn, A. 2006; Calori, R., Atamer, T., Nunes, P. 1999; Castells, M. 2005- 2007; Chobanova, Y. 2009; Dodgson, M. 2010; Epping, R. Ch.

2009; Gillespie, A. 2010; Gros, D., Steinherr, A. 2004; Hayes, J. 2010; Johnson, D., Turner, C. 2006; Harrison, A., 2010; Hunt, S.D., 2000; Parker, B., 2005; Stiglitz, J. 2009).

The necessity for the development and modernisation of the high technologies sector in the European Union is determined by a number of *problems*, the analysis and systematisation of which is described in various scientific publications (Melnikas, B. 2002, 2011; Melnikas, B., Reichelt, B. 2004; Wiener, A., Diez, Th. 2009).

The main *problems* typical of the contemporary situation in the European Union that require essential and radical decisions in the area of development and modernisation of the high technologies sector are the following:

1. Within the territory of the European Union, *very limited resources of energy and raw-materials* exist. In the context of economic development, the needs for these resources have been steadily growing, which means that the European Union becomes more and more dependent on the possibilities to increase those needs, the consumption and usage of these resources: *perspectives of economic development* of the European Union, along with *economic and energy security* of the European Union have been influenced by various economic and political factors characterising the export of these resources to the European Union;

2. European Union faces many *employment problems*, in particular in the area of employment of *well-educated young people*. On the other hand, in many cases the *lack of simple labour force*, as well as the *lack of certain types of specialists* starts limiting economic growth, business activities and technological progress;

3. *Very high standards of living are implemented* within the countries of the European Union, including the spheres of social security and social guarantees, as well as environmental protection. As a consequence, all the economic endeavours within the territory of the European Union require substantial expenditure, which subsequently means that the *cost price* of the products manufactured in the European Union is *very high*. The increase of the cost price that is disproportionate to the quality of products determines the fact that products manufactured in the European Union become increasingly *uncompetitive;*

4. The key indicator for the well-being of the European Union is the ability to manufacture products increasingly and more massively both in their local and global markets, and sell high quality and high price products. This means that in the European Union, the need for more markets to sell their own products is constantly increasing (sufficiently high purchasing power is also very important). Inadequacy of such markets threatens the development of the economies of the European Union.

These problems show that there is a strong need for both *quantitative* and *qualitative transformations* in the European Union (Fligstein, N. 2010; Lane, J.E., Ersson, S.O. 1996; Hix, S. 2006; O'Mahoney, J. 2010; Sabathil, G., Joos, K., Kessler, B. 2008). It could be noted that these transformations include the processes of creation, development and modernisation of the high technologies sector.

Necessity to respond to these problems determines the main *challenges* for the European Union and its development:

1. *Quantitative increase of the European Union* is orientated towards the following:
   - the European Union could possibly win more markets to sell its production,

- the European Union could possibly gain better 'direct' access to the countries in Eastern Europe, Central Asia and the Near and Middle East, where huge supply of energy and raw materials is accumulated and where great potential markets exist for the products manufactured in the European Union;

2. *Qualitative development of the European Union* is oriented towards the goal to create *a knowledge-based society and knowledge economy* in the territory of the European Union. This could ensure the following:

- ability to create an alternative energy sector and other sectors of economy within the European Union, which could allow strongly decrease the dependence of the economies of the European Union on the import of traditional energy and raw materials,
- ability to create and widely distribute brand new products and technologies in the global market, which could allow the European Union to become a world leader in many spheres of economic and social life.

It is worth noting that over the last decade more possibilities to ensure *quantitative increase* can be observed in the European Union, whereas in the sphere of *qualitative development* numerous difficulties and unpredicted obstacles can be noticed (Melnikas, B., Reichelt, B., 2004, Melnikas, B. 2011). For this reason, qualitative development of the European Union should deserve priority consideration: the prospects of the European Union are basically influenced by the *creation of a knowledge-based society and knowledge-based economy*, especially – by the *creation, development and further modernisation of the high technologies sector*.

2. Specific Features and Structure of the High Technologies Sector in the European Union

The high technologies sector in the European Union could be defined as a very important, very complicated and multifaceted part of contemporary economy and of the social and economic life system in the present-day world in general and especially – in the European space. At the same time, it could be said that the high technologies sector of the European Union can be defined as a very important, complicated and multifaceted object of scientific cognition, research and studies.

Many quite different approaches exist as to the definitions, composition and structure of the high technologies sector (Melnikas, B. 2011).

However, in all cases it could be said that the high technologies sector has *several essential features*:

- creation, development and further modernisation of the high technologies sector should be defined as *the main precondition for the qualitative changes and qualitatively new outbursts* in all fields and sectors of contemporary societal life, including all sectors of contemporary economy, all countries and regions, the life and priorities of all groups of society, all areas and political, social, economic, technological development and of the changes in culture, lifestyle and structure of values,

- *industrial products and various services* of the high technologies sector have *absolutely new quality*, the essence of which – *innovations, new knowledge and new results of the intellectual activities*, as well as *new development or usage potential* accumulated in these products or services,
- *intellectual and innovative activities*, including the creation, multiplication and practical usage of new knowledge, should be defined as *the main activities* in the high technologies sector,
- *intellectual resources* and *human resources oriented towards intellectual activities, creativity and innovations* should be defined as *the main resources* in the high technologies sector,
- *qualitatively new features*, especially those characterising *new knowledge and innovations, novelty and new quality of products* as well as *novelty and new quality of methods, technologies and organisational forms of activity*, are *the dominant characteristics* of the high technologies sector,
- the high technologies sector is *complex and integrated in nature*, this sector covers and involves *many units and parts of different profiles with different functions and orientations towards different results that are complementary to each other*,
- development processes and activities in the high technologies sector are based on the *interaction* between various units and parts of the sector, as well as between different structures and systems of the contemporary society and global economy, in different countries or regions; in general, the development processes and activities in the high technologies sector are based on *creativity and innovations*, also on the *orientations towards various synergy effects*, representing the new quality and qualitatively new results,
- *intensive internationalisation* should be defined as an *especially important precondition* for the creation, development and further modernisation of the high technologies sector in various countries, regions and in global spaces.

In general, these *essential features* could be defined as *the prevailing characteristics of the high technologies sector*. Of course, these characteristics could involve a number of additional features.

It must be noted that the high technologies sector involves many different units, parts, industries, as well as different types and forms of production, manufacturing and services.

In all cases it is important to note that *the main preconditions and assumptions* for the development and modernisation of the high technologies sector in the future are closely related to *the creativity and intellectual activities, innovation processes and innovative activities, internationalisation and international cooperation* in all spheres of social, economic, technological development, as well as to *the synergy effects-oriented interaction* between different units, parts, structures and systems, especially between units, parts, structures and systems responsible for different functions and activities in different areas of fundamental and applied scientific research, university studies and professional education, consulting, other academic and intellectual activities, various areas of practical business and industrial activities, various public and governance institutions and organisations.

The high technologies sector is characterised by the *variety of technologies used and products created*, as well as by the *variety of the legal status and organisational forms* of enterprises, institutions and other organisations operating in this sector.

It must be noted that many spheres and specific sectors of contemporary economy could be defined as *particularly important and typical or traditional parts* of the high technologies sector:

- information and telecommunication technologies sector, as well as modern communication, including electronic communication, media and other services characterised by the use of modern information and telecommunication technologies,
- various industries, characterised by the use of the mechatronics and modern electronic technologies, especially appliances, instruments and machinery manufacturing industries,
- various industries characterised by the use of modern bio- and chemical technologies, as well as pharmaceutical industries,
- various industries and services oriented towards the use of modern transportation technologies and logistic systems,
- various industries and services oriented towards aircraft production and aviation modernisation, as well as to the aeronautical development and to the activities in the aerospace,
- various industries and services oriented towards the creation, production and use of new materials,
- various industries and services oriented towards the development of maritime transport, modern fishery, as well as to ship manufacturing,
- various industries and services oriented towards the creation and development of alternative and more effective energy,
- various industries and services oriented towards the creation and development of more effective agricultural sectors,
- various services in all healthcare sectors, also medical services in general,
- military industries and security services,
- other various atypical or unconventional parts of the high technologies sector.

All these parts of the high technologies sector could be defined as especially important in the contemporary conditions of European integration and in the context of development and enlargement of the European Union. In addition, it can be seen that the processes of creation, development, multiplication and use of high technologies are affecting each and every area of social, economic and technological life of the contemporary society: these processes could be defined as *absolutely universal processes typical for contemporary society*.

3. Theoretical Approaches to the Creation, Development and Modernisation of the High Technologies Sector in the European Union: Orientation to Synergy Effects

The processes of creation, development and further modernisation of the high technologies sector in the European Union are inseparable from general processes of creation of a knowledge- based society and knowledge economy. This means that scientific research on the processes of creation, development and further modernisation of the high technologies sector could be based on *the same theoretical foundation and*

approaches as the scientific research on the processes of creation of a knowledge-based society and knowledge economy in general. It can be assumed that the general theoretical background for solving the problems of creation of a knowledge-based society and knowledge economy could be used in many specific cases of creation, development and further modernisation of the high technologies sector.

Various *theoretical approaches to the processes of creation of a knowledge-based society and knowledge economy* could be perceived and defined as *a theoretical basis for the scientific cognition and research on the processes of creation, development and further modernisation of the high technologies sector in the European Union*. It is obvious that the main theoretical approaches to the processes of creation of a knowledge-based society and knowledge economy could be defined as *quite universal* and *suitable* in many cases of scientific research on the creation, development and further modernisation of the high technologies sector (Melnikas, B. 2002, 2011).

The processes of *integration* and *synthesis* could be defines as the main development processes typical for the creation of a knowledge-based society and knowledge economy (Melnikas, B. 2002, 2011). Processes of *integration* usually prove that in the course of amalgamation, the colliding elements *never lose their major primordial features:* this means that the *result of integration marking the new quality can be disintegrated according to previous features of the amalgamated elements.* Processes of *synthesis* demonstrate that the elements colliding in the course of amalgamation *lose their major primordial features;* this means that that the *result of the synthesis possessing new quality cannot be disintegrated according to the previous features of the collided elements. Qualitative changes within the synthesis are never recurrent*, whereas *qualitative changes within the integration may recur* in some cases (Melnikas, B. 2002, 2011).

Understanding the meaning of the processes of integration and synthesis as the processes for the creation of new quality allows broad application of *the universal principle of creation of new quality,* examining extremely complex manifestations of the development, modernisation and enlargement of the European Union, including the creation of a knowledge-based society and knowledge economy. When analysing these manifestations, it is critical to assess *to what extent* the development, modernisation and enlargement of the European Union is based on the processes of *integration* and to *what extent* the processes of *synthesis* determine the development, modernisation and enlargement of the European Union.

While elaborating and implementing the strategies of creation of a knowledge-based society and knowledge economy, it is necessary to logically forecast various tools designed for the expansion and development of the *integral economic, social and cultural space of the European Union:* these tools should inevitably include the tools oriented towards both the processes of *integration* and *synthesis.*

Rational complementation of the tools designed for integration and synthesis can form the basis for the implementation of very effective strategies for the creation of a knowledge-based society and knowledge economy in the European Union. Subsequently, application of the *universal principle of creation "of the new quality"* should be given *priority* when elaborating and implementing strategies designed for the development, modernisation and enlargement of the European Union (Melnikas, B. 2011).

It can be repeated that these relatively universal theoretical approaches to the processes of creation of a knowledge-based society and knowledge economy could be used in many cases for solving problems of creation, development and further modernisation of the high technologies sector in the European Union.

At the same time, it can be seen that some *specific circumstances* are typical for the processes of creation, development and further modernisation of the high technologies sector in the European Union: these *specific circumstances* could be defined as very important and having a significant impact on the situation in social, economic and technological space of the European Union.

Conclusions and Recommendations

Creation, development and modernisation of the high technologies sector in the European Union, as well as *general intellectualisation of social and economic life* and *creation of a knowledge-based society and knowledge economy in the European Union in general* is a very complex, long-term and multifaceted process.

The key *challenges and priorities* that require the main focus in the context of creation, development and modernisation of the high technologies sector in the European Union, also the creation of a knowledge-based society and knowledge economy in general, are the following:

1. Creation, development and modernisation of the high technologies sector in the European Union, also creation of a knowledge-based society and knowledge economy in the European Union in general should be oriented towards the solution of the following *problems:*

- problems *of insufficiency and increase in the cost* of energy and raw materials, as well as problems of *secure and reliable* import of these resources, along with the problems of creation of *alternative energy* and *economies oriented towards alternative raw materials*,
- problems of *new prospective markets* necessary *for the implementation* of production in the European Union, and problems pertaining to its development and introduction,
- problems of the required potential development for *state-of-the-art* products, as well as problems of *compatibility of the products oriented towards high technologies in the* global markets,
- problems of *social security, economic well-being,* as well as improving *social, legal and ecological environment*.

2. The main *problems* typical of the contemporary situation in the European Union which require essential and radical decisions in the area of development and modernisation of the high technologies sector are the following:

- within the territory of the European Union, the *sources of energy and raw materials are very limited*: in the environment of economic development, the needs for these resources have been steadily growing, which means that the European Union becomes more and more dependent on the possibilities to increase the

needs, consumption and usage of these resources: *perspectives of economic development* of the European Union, along with *economic and energy security* of the European Union has been influenced by various economic and political factors characterising export of these resources to the European Union,

- the European Union faces many employment problems, especially in terms of *well-educated young people* (on the other hand, in many cases, the *lack of a simple labour force*, as well as the *lack of certain types of specialists* begins to limit economic growth, business activities and technological progress),
- *very high standards of living are implemented* within the countries of the European Union, including the spheres of social security and social guarantees, as well as environmental protection: as a consequence, all the economic endeavours within the territory of the European Union require substantial expenditure, which subsequently means that the *cost price* of the products manufactured in the European Union is *very high*.

3. The key indicator for the well-being in the European Union is the ability to manufacture products increasingly and more massively both in their local and global markets, and to sell products of high quality and price. This means that in the European Union, the need for more markets to sell their own products has been increasing (in addition, the existence of an adequately high purchasing power is crucial). Inadequacy of such markets threatens the development of the economies of the European Union;

4. The basis for the creation, development and modernisation of the high technologies sector in the European Union, as well as for the creation of a knowledge-based society and knowledge economy in the European Union in general, is the implementation of *the universal principles of creation of a new quality* and *creation of a new technological quality*, designed to complete the following:

- the development of the new type of society and economy is based on the concurrent *processes of integration and synthesis,*
- when creating a knowledge-based society and knowledge economy in the European Union, including the processes of creation, development and modernisation of the high technologies sector, the *integral cultural space* should be created,
- when creating a knowledge-based society and knowledge economy in the European Union, including the processes of creation, development and modernisation of the high technologies sector, *strategies oriented towards integration and synthesis* should be created and implemented.

Further scientific research and practice dedicated to the creation of strategies for a knowledge-based society and knowledge economy in the European Union, including processes of creation, development and modernisation of the high technologies sector, are greatly promising and important.

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INTELEKTUALIZAVIMO PROCESAI EUROPOS INTEGRACIJOS KONTEKSTE: AUKŠTŲJŲ TECHNOLOGIJŲ SEKTORIAUS PLĖTROS POREIKIAI IR PRIORITETAI

Santrauka. Šiame teorinio pobūdžio straipsnyje yra aptariamos aukštųjų technologijų sektoriui Europos Sąjungoje būdingos problemos bei analizuojami raidos procesai, paasireiškiantys šiuolaikinių globalizacijos, Europos integracijos, žiniomis grindžiamos visuomenės bei žinių ekonomikos kūrimo, taip pat ir intelektualizavimo įvairiose socialinio ir ekonominio gyvenimo srityse iššūkių kontekste.

Pagrindinis dėmesys yra skiriamas aukštųjų technologijų sektoriaus Europos Sąjungoje kūrimo, modernizavimo bei tolesnės plėtros poreikiams ir prioritetams, ypač – šiuolaikinių socialinio ir ekonominio gyvenimo intelektualizavimo procesų kontekste.

Aukštųjų technologijų sektoriaus Europos Sąjungoje kūrimo, modernizavimo bei tolesnės plėtros procesai yra traktuojami kaip itin reikšminga šiuolaikinei Europos Sąjungos visuomenei būdinga socialinės, ekonominės ir technologinės raidos transformacija. Straipsnyje yra aprašomos ir analizuojamos tendencijos, pasireiškiančios šiuolaikinėmis aukštųjų technologijų sektoriaus kūrimo ir modernizavimo, taip pat Europos Sąjungos plėtros sąlygomis. Aptariamos įvairios naujos netradicinės idėjos ir modeliai, skirti tiek apskritai ekonomikos raidai intelektualizavimo procesų kontekste, tiek ir aukštųjų technologijų sektoriaus kūrimui, modernizavimui bei tolesnei plėtrai. Apibūdinami Europos bendros ekonominės kultūros ir socialinės erdvės, pasižyminčios orientacijomis į aukštųjų technologijų plėtrą, raidos procesai.

Detaliai aptariami aukštųjų technologijų sektoriaus Europos Sąjungoje kūrimo, modernizavimo bei tolesnės plėtros poreikiai ir prioritetai, atskleidžiami svarbiausieji globalizacijos, Europos integracijos, žiniomis grindžiamos visuomenės bei žinių ekonomikos kūrimo, taip pat ir intelektualizavimo įvairiose socialinio ir ekonominio gyvenimo srityse procesų sąlygojami iššūkiai, nulemiantys aukštųjų technologijų sektoriaus plėtros poreikius ir perspektyvas. Straipsnyje apibūdinama aukštųjų technologijų sektoriaus struktūra, charakterizuojamos svarbiausiosios jo dalys.

Pažymėti sarbiausieji ypatumai, būdingi šiuolaikinei socialinei, ekonominei bei technologijų pažangai, tarp jų – aukštųjų technologijų sektoriaus raidos procesams, parodytas būtinumas šiems ypatumams teikti išskirtinį dėmesį visais atvejais, kai tenka spręsti įvairias aukštųjų technologijų sektoriaus raidos problemas ir tinkamai pasirinkti šioms problemoms spęsti skirtas priemones. Parodytos įvairios galimybės panaudoti naujas netradicines idėjas ir modelius, skirtus sėkmingai socialinei, ekonominei ir technologijų pažangai Europos Sąjungoje atsižvelgiant į šiuolaikinius iššūkius, tarp jų – plėtojant ir modernizuojant aukštųjų technologijų sektorių. Apskritai straipsnyje pateiktos idėjos vertintinos kaip efektyvios ir perspektyvios siekiant šiuolaikinių Europos integracijos iššūkių kontekste aktyvinti intelektualizavimo procesus ir inovatyvią aukštųjų technologijų sektoriaus raidą.

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