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THE POSITION OF KNOWLEDGE WORKERS IN KNOWLEDGE-BASED ECONOMY: MIGRATION ASPECT

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Abstract

The influence of workers for economy development is unquestioned phenomenon. The modern managerial theories highlight the emergence of new engines which stimulates the growth processes of economy. Knowledge and information consider as new types of growth engines totally changed the features of XXI'st century's economy. As a consequence of USA's economy's transformations new class of workers – knowledge workers – emerged in the early 1960's. It is a key to stress that economies' of different world countries are shaped by many micro- and macro-factors. One of them is migration. As a rule knowledge-based economies' (KBE) are particularly sensitive for the consequences of knowledge workers migration. Mentioned factors stimulated the choice of the object for the research. Wherefore comparing and systemizing different scientific works the definition of knowledge workers and classification of knowledge workers categories considering occupation are presented in the article. The analysis is pointed out to the explanation of factors of knowledge workers migration in the individual and governmental level. The conclusion was made that migration of knowledge workers usually causes the effects of "brain drain", "brain gain", "brain circulation", "brain exchange" and "brain waste". The expression of these is analyzed in the article as well. In order to suggest the concrete actions how to suspend and attract knowledge workers to Lithuania the tendencies of knowledge workers migration in EU and the world were presented in the article. There was highlighted the main destinations of knowledge workers migration as well as the traditional consequences of knowledge workers migration for the country's economy.

Keywords:

Knowledge workers; knowledge worker's migration; "brain drain"; "brain gain"; "brain circulation"; knowledge worker's migration factors.

Introduction

The features of knowledge-based economy (KBE) differ from resource-based economies. New occupations like financial and management consultants, information technology analysts, project engineers and computer technologists have emerged in response to demands of modern corporations. Incumbents of these new occupations have been referred to as knowledge workers. They are expanding occupational groups and are increasingly being considered as key expert groups in advanced western economies (Drucker, 1989; Baldwin, 2001; Beckstead, 2003; Lavoie, 1998; Lee, 1996; Mahroum, 1999; Massey, 1998; Tam, etc., 2005; Kriščiūnas, 2006).

Many of theoretical findings concerning knowledge workers are made in the organizational management level. (Tam, etc., 2005; Alvesson, 2000; Kanter, 1998; Zuboff, 1988; Causer and Jones, 1996; Raelin, 1985, etc.). However theoretical and practical findings about the knowledge workers importance for overall economy development are still missing.

The accumulation of human capital is especially relevant to the knowledge-based economies. In this light the topic of knowledge workers migration gains new importance and becomes a sensitive issue with developmental implications. This phenomenon is analysed by scientists (Ferro, 2006; Docquier, Marfouk, 2006; Castles, Miller, 2003; Massey, 1998; Sassen, 1994; Lowell, Findlay, 2001; Straubhaar, 1998; 2000; Wolff, 2006) as well as OECD and European Commission. There is emphasised the complication of measurement of this worker's type migration. Nevertheless scientists' agree that international mobility of highly skilled workers represents an increasingly large and complex component of global migration streams. The phenomenon of highly skilled migration can assume the features of brain drain – the massive flow of intellectual human capital directed to the most

developed countries – facilitated by selective immigration policies (Lowell, Findlay, 2001) and by knowledge-based metropolitan economies in search of qualified resources (Sassen, 1994).

Totally the consequences of population migration are analysed do not emphasizing knowledge workers category. However the consequences of "brain drain" are very painful for knowledge-based economies. The problem of knowledge workers migration is topical almost for four decades. Starting from 60's – 70's when the first wave of knowledge workers migration raised. And the second wave which started in 90's. The motives and effects of knowledge worker's migration for economy development were different.

Considering mentioned above the **research problem** being solved in this article should be constructed: how to systemize and construct the definition of knowledge workers in order to highlight the specificity of knowledge workers migration in Europe and World and to suggest the actions making possible to reduce the negative "brain drain" effect and to retrieve "the brain"?

The **object of research** is knowledge worker's migration.

The **aim of the article** is to highlight the position of knowledge workers in knowledge-based economy in order to analyze the migration tendencies of knowledge workers in Europe and Word and recommend certain actions for the solving of a problem of "brain drain". To achieve this aim four tasks are to be solved:

- to classify the occupations in order to crystallise the conception of knowledge workers;
- to analyze theoretical interpretations of worker's migration an highlight the effects of knowledge workers migration;
- to analyse the tendencies of knowledge workers migration in Europe and World;
- to emphasize the results of knowledge workers migration for the country's economy;
- to analyze the determinants which affect the knowledge workers solution considering migration;
- to present recommendations for policy makers how to suspend and attract knowledge workers.

As the *research method* it was taken theoretical analysis of the scientific works in this field. Analysis of statistical data concerning knowledge workers migration was applied as well.

Knowledge Worker's Conception

The main drivers of evolution of economy as well as society are changing (Kriščiūnas, Daugėliene, 2006). One of the consequences of transformations is the change of individual thinking, scope of work and the total needs of local and global market. Here the new conception arises in many of scientific as well as in practical works (Drucker, 1989; Baldwin, 2001; Beckstead, 2003; Lavoie, 1998; Lee, 1996; Mahroum, 1999; Massey, 1998; Tam, etc., 2005; Kriščiūnas, 2006; Daugėlienė, 2005; Zhao et al., 2000; Baldwin, 2001, etc.) – this is *knowledge workers*.

For the first time term "knowledge worker" was mentioned by Peter Drucker in his work "Landmarks of Tomorrow" (1959). There was stressed analysis to the individual who consider the accumulation and dissemination of information as one of the assumption for identification of problem as well as for decision making. In the later works of Drucker (1989; 2001), Lee et al., (1998), Zhao et al. (2000), Baldwin, Gellatly (2001) there was highlighted that the rise of the "class" succeeding the industrial blue-collar worker is not an opportunity but challenge to him. The share of knowledge workers in total amount of workforce is rising all the time.

The shift from "blue collar" workers to knowledge workers in the United States started in 1990. Different situation, according to Drucker (2001), was in industrialized Europe – the United Kingdom, Germany, France, Belgium, northern Italy, where the belief is still deeply ingrained that industrial, blue-collar work, rather than knowledge. The scientist raises the question: will Europe be able to react the way the American done two decades ago? Considering the latest figures about the economic growth of leading countries of Europe – Denmark, Finland, and Sweden – perspectives should be evaluated as positive for Europe development and challenging for United States which economic growth seems to be in "positive-stagnation" position in comparison with European progress (Daugėlienė, 2006).

The conception of knowledge workers presented in the latest works of Drucker, Lee et. al., Miller differ from that presented in the modern scientific literature. Drucker (1989) highlighted some basic characteristics of knowledge workers:

the most of work they perform by arms. But the salary depends on level of qualification acquired during informal learning;

the most part of their work day these workers have to perform not experienced work (e.g. nurse obliged to check the patient's bed, answer the phone callings, perform other administrative work); However these workers feel themselves as „professionals" not „physical workers";

consider themselves as "associates" not subordinates. For, once beyond the apprentice stage, knowledge workers must know more about their job than their boss does – or else they are no good at all. In fact, that they know more about their job than anybody else in

the organization is part of the definition of knowledge workers;
identify the work as the way of living, the possibility for self realisation as well as knowledge acquisition and dissemination.

The Miller's W.C work „Fostering intellectual capital" (1998) represent the knowledge workers as individuals who use intellect in order to transform ideas into product or service. In other words, in order to commercialise knowledge. This process is very important in knowledge economy because stimulate the emergence of intellectual products as well as services (Kriščiūnas, Daugėlienė, 2005).

Considering the conditions of modern transformed economy there is a necessity to re-look and correct the conception of knowledge workers. There should be pointed out that *knowledge workers* are individuals who accumulate, create and disseminate knowledge during the performance of job. They "produce" innovative ideas and use modern technologies in their activity. They cooperates and do not avoid challenges as well as positive risk. Knowledge workers consider as top company asset (Rogoski, 1999). They are a group that gives the emerging knowledge society it's character, it's leadership, it's social profile. Knowledge workers may not be the ruling class of the knowledge society, but they already are it's leading class (Drucker, 2001). And, what is very important to understand for each individual of XXI century – each knowledge worker should change the way of thinking and manage oneself. They have to think and behave as a chief executive officer.

Bender (1998), Halal (1998), McGinn and Raymond (1997-98) define knowledge workers considering the characteristics which are common for this category of workers (e. g. lowers, doctors, programmers, teachers or scientists). This is *high qualification professionals*. Other scientists (Miller 1998; Shea 1998; Verespej 1999; Gordon 1997) characterising knowledge workers highlight the *high skills of individuals (inborn talent)*. These declare that knowledge workers are individuals who can analyse and systemise information which will be used for decision making. The third method for explanation of knowledge worker phenomena is to stress the *education and competence of individuals* (Munk 1998; Allee 1997).

Taking into account Standart Occupation Classification, Beckstead and Vinodrai (2003) highlighted the classification of knowledge workers professions. The scientists enumerate such groups of workers as *leaders and managers*; *representatives of business, science and engineering*, *technical science*, *health care, education, law and social sciences* as well as *representatives of art and culture*.

Beckstead and Vinodrai (2003) where not single scientists who presented the classification of knowledge workers. Classification of occupations into knowledge, data, service and goods workers (as it is seen, the classification is more detailed) was presented by Wolff (2006). The author enumerates 267 occupations. The systemized and adapted scheme is presented in Figure 1.

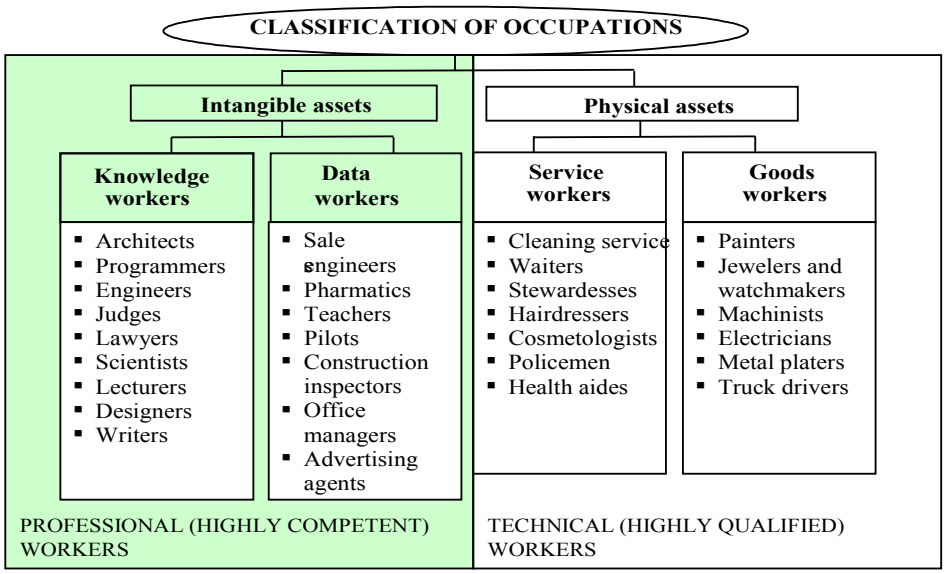

Figure 1. Classification of occupations

Wolff's (2006) classification of occupations into knowledge, data, service and goods workers demonstrates the variety of occupations types and highlight the difference between those individuals using intangible assets for decision making and creation of intellectual product (knowledge and data workers); and those who apply physical assets in order to produce tangible materials (service and goods

workers). In scientific works there can be met other interpretations of terms presenting workers categories. *Knowledge workers* are called as *professional (high competence) workers*. And *workers who apply or use knowledge* and create tangible products are interpreted as *technical (highly qualified) workers*.

Theoretical analysis of different conceptions of knowledge worker allow to construct the whole definition and consider that *knowledge worker* is – this is highly skilled individual who is able to convert knowledge, intellect, wisdom and ideas into tangible innovative product or service. On the other hand, knowledge worker can create tangible products, to teach other people by transferring own competence and skills. Knowledge worker is not only who things how to work. Knowledge worker can use others intellect for the creation of innovative, value added products.

Usually two categories of workers – knowledge and qualified – are interpreted as the same. This research maintains that the difference between knowledge and qualified worker is obvious and should be highlighted. As it was mentioned above, knowledge workers apply, create and transfer knowledge and ideas in order to create innovated product. Contrarily, qualified workers are more specialists (craftsmen) than creators. That is why the difference between qualified and competitive workers exists.

The problem of knowledge workers migration is needed to be solved in knowledge-based economies. It is economically sensitive for the "source" country. Skilled migration and brain drain assuredly affecting the landscape of many nations: their positive and negative consequences in both origin and destination countries enter social and political policy agendas and debate in academic discussions. This phenomenon – even if numerically limited – represents an important intersection of contemporary, international migration flows, labour markets and economies.

Theoretical Interpretations of Worker's Migration

Basically the term migration represents temporal or permanent movement of human beings inside the residential country or from one country to another. Migration of people firstly is connected with such terms as *immigration* (this means entering the country); *emigration* (leaving the country) and *transit* (person enter foreign country through the third country where he / she receives more experience, new knowledge).

There could be highlighted two types and concrete motives of knowledge workers emigration:

- *compulsory emigration* which could be encouraged by possible threat in residential (native) country. Usually the motives for this emigration are based on political, religious, ethnic or racial issues. Compulsory emigration could be interpreted as *long emigration* (this depends on the duration of emigration);
- *voluntary emigration* which usually could be stimulated by the search of better economic or social conditions to live. Wish to leave native country could be based on the family situation when family members do not want to live separately. Voluntary emigration could be stimulated even by trying to hide criminal actions. Voluntary emigration could be interpreted as *permanent or long emigration*. This depends on motives and the purpose of migrant.

Problem of international mobility usually cover two aspects: migration of qualified and non-qualified workforce and migration of knowledge workers. Meaningful to stress that mostly all studies concerning migration problem is oriented to the total migration trends not differentiating skilled and not skilled workers.

The scientific studies of possible factors of people migration inspired to construct a scheme of factors which influence the individual decision migrate or not to migrate (Fig. 2). The analysis is based on two points of view: individual and governmental (country's) level. The analogical scheme could be applied for assessing the factors of knowledge workers migration.

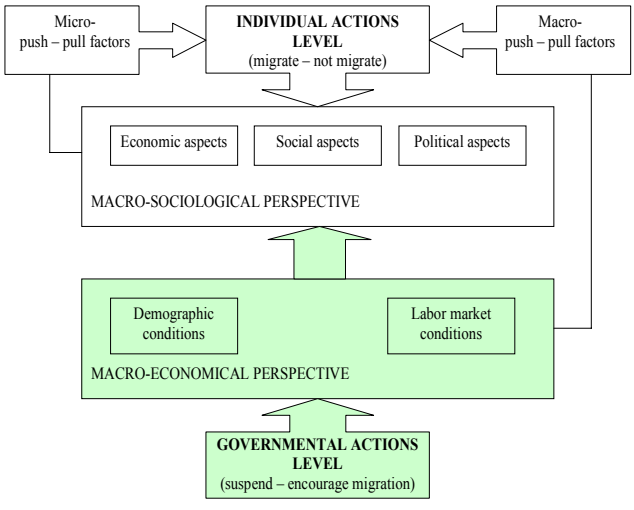

Figure 2. Scheme of factors influencing individual's choice concerning migration

The scheme enhances that the main influence on individual's choice migrate or not to migrate depends on *governmental actions (policy)*. This could be oriented to the *suspension* or *encouragement of migration*. It is obvious that *demographic conditions* and *labour market conditions* (those are the most sensitive in a case of migration) from the macro-economical perspective directly depends on

governmental policy and strategies concerning the development of KBE. Governmental actions create a background for the *macro-sociological factors* (economic, social; political) which affect individual's choice concerning migration. From the macro-sociological perspective *micro- push – pull factors* exists. These could be interpreted as different psychological factors, view points of friends and family members. *Macro- push – pull factors* usually flows from the governmental actions. That is why they are concerned with the total economic situation in country.

The Effects of Knowledge Worker's Migration

The consequences of knowledge workers migration are more obvious and economically as well as socially sensitive for sending (source) country. In many countries, foreign-born persons represent a significant percentage of persons with tertiary education (OECD, 2006). This fact substantiates the importance of consequences of knowledge workers migration. Nevertheless Massey (1993), Ferro (2006), Docquier, Marfouk (2006), Castles, Miller (2003), Wolff (2006), Lien, Wang (2005), Moguerou (2006), Panescu (2005) emphasize the complication of measurement of knowledge workers migration consequences.

Usually the knowledge workers migration phenomenon is directly concerned with *"brain drain", "brain gain","brain bank"* and *"brain circulation"*. Scientists mention and other terms like "brain waste" or "brain exchange". These terms concerning the effects of migration of knowledge workers could be systemized and interpreted as *positive* or *negative* for knowledge-based economy development (Fig. 3).

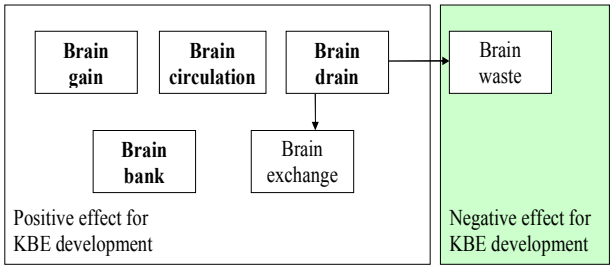

Figure 3. Knowledge workers migration consequences and effects for KBE development

Usually "brain drain' is interpreted as negative effect of knowledge workers migration for the KBE development. But, it is important to stress that "brain drain" can arise and very positive effect when persons emigrate in order to share knowledge what is called "brain exchange". Here negative effect could be encouraged just in one case when highly competitive persons leave country for a long period or even for all live. This situation should be evaluated as "brain waste" and totally negative effect for KBE development. "Brain exchange", "brain circulation" and "brain gain" is very welcome in different countries especially for those with law human capital potential. Here should be highlighted that short period "brain exchange" ad "brain circulation" can arise positive long-term dynamic economical as well as social effect in sending country. Modern managerial theories emphasize and "brain bank" effect which means that country should collect and save "brain" in order to ensure the KBE development.

Summarizing the information found in different scientific and practical studies the conclusion could be made that intensity of knowledge workers migration depends on probability to migrate; if the result of migration is positive we are speaking about brain gain; otherwise – when country feels the loss of human potential it is affected by brain drain. The source countries usually are interpreted as brain drain countries or source countries and the effect of knowledge workers migration from these countries is obviously negative. The benefit from migration depends on human capital transferability across country (Lien, Wang, 2005). Brain drain may occur when the exogenously or endogenously determined probability to immigrate is large.

Experts affirm that knowledge workers migration causes positive and negative consequences both for "source" and "purpose" countries (see Table 1).

Table 1. Positive and negative effects of knowledge workers migration for „source“ and „purpose“ countries

		Effect for „source“ country	Effect for „purpose“ country
Long-term migration	*Dis-advantages*	Loss of investments in education of individuals; Loss of high competence specialists; The negative changes considering demographic situation; Decline of producing amounts.	Declines the ambitions of local habitants to seek for the highest qualification; Possibility to lose the know-how potential.
	Advantages	Return of migrants with new competence, new relations with foreign partners; Decline of unemployment level; The growth of average wages.	Knowledge workers invest in competence as well as in adaptation to new life circumstances; Growth of GDP; Growth of investment in R&D; Total growth of economy.
Short-term migration	*Dis-advantages*	Decline of financing of social security; Rapid growth of wages in those sectors where the shortage of workforce because of migration is obvious.	Loss of resources; The consumption of immigrants is minimal as they expect to return to the „source“ country.
	Advantages	Decline of unemployment level; Return of knowledge workers with new competence.	Growth of GNP; Payment of taxes; Occupations which are not popular between local inhabitants are occupied by immigrants.

Knowledge Workers Migration Tendencies in Europe and World

Modern economies rely on human expertise and compete in attracting the best competencies. However, migration of the highly skilled remains limited as most international migrants are medium and low-skilled persons (OECD, 2005). In resent years there has been a growing move towards international recruitment and mobility of the highly skilled. While there seems to be a rather balanced pattern of international mobility among different countries, there is concern that “brain drain” occurs in some developing countries (Straubhaar, 2000). Furthermore, lack of data on the permanent and temporary flows of migrants according to skill levels in many OECD countries make international comparisons difficult (OECD, 2005; 2007).

The basic analysis of emigration tendencies considering education level of emigrants show that the biggest size between emigrants from Sweden, France, Germany, Poland, Lithuania, USA, Ireland and G. Britain in 2000 where those with tertiary education (Eurostat, 2007).

According to OECD data migration of knowledge workers streams are primarily directed towards four destinations. The United States is first, with over 7.8 mln. highly skilled expatriates. The EU follows with 4.7 mln., before Canada and Australia, with 2 and 1.4 mln. highly skilled foreign residents, respectively. Over half of these migrants come from outside the OECD area. In addition to the 6.7 million highly educated persons involved in intra OECD skill flows, the region has attracted 10.1 million from non-OECD countries. Non – OECD migrants make a greater contribution to the highly skilled than medium- or low-skilled migrants.

US, Japanese and Korean emigrants represent a very small share of the total population. European natives are more likely to go abroad, especially if they are highly educated. Two-thirds of OECD-area highly skilled expatriates are European. *Emigration is particularly frequent from the United Kingdom and Austria, and also common from Eastern Europe.* Whereas knowledge workers migration to and from Japan or Korea is limited, the share of immigrants to the United States exceeds by far that of US expatriates. The vast majority of OECD countries are also net beneficiaries of highly skilled migration when immigration from non-OECD countries is taken into account. However, a number of European countries have more highly skilled expatriates in the OECD are tan they host from non-OECD countries.

The United States, France, Portugal, Spain and the United Kingdom benefit from a strong colonial heritage or linguistic advantages and seem best able to attract highly skilled workers from non-OECD countries. The United States has one non-OECD highly skilled person for ten natives. In the EU, mobility of knowledge workers is primarily intra-European, although traditional inflows from North Africa and Eastern Europe are significant.

In the total OECD area, about 4% persons with tertiary education are immigrants from other OECD countries. Those from non-OECD countries account for about 6% of all current residents with tertiary attainment. Net stocks of foreign-born persons with tertiary attainment are highest in the traditional “settlement” countries of Australia, Canada and US, but also in Luxembourg and Switzerland. Other

countries relatively with high level of immigrats with tertiary education are Sweden and France (8-9%). Quite a few countries have close to zero net movements overall, essentially because they gain as many as they lose to within-OECD migration (Austria, United Kingdom, Italy, Netherlands, New Zealand) or they do not show many movements in general (Japan and Korea) (OECD, 2006).

The situation of Lithuania's emigrants who did not declare the emigration is shown in table 2.

Table 2. Lithuania's emigrants considering former professions

Type of workers	In comparison with total emigrants (%)
Knowledge workers	**21, 0**
Service and trade workers	6,5
Qualified workers	28,3
Elementary professions	7
Without profession	37,2

Shown proportions of emigrants from Lithuania confirm the trouble concerning the problem of knowledge workers migration. 21 percent could be evaluated as dangerous for Lithuania's economy. Because of status of small country as well as source country (in most of cases) Lithuania suffer from brain drain. Policy changes encouraging the brain circulation or brain exchange should be made by appropriate policy makers.

The Results of Knowledge Worker's Migration for the Country's Economy

Common results of migration to the country's social, cultural and economical life are:

- threats for the civil society as well as for the intellectual potential;
- influence on country's image as well as reputation in the world;
- economical and social effect.

The last one is the object of this article. Several economical and social effects of migration for the development of KBE in the country could be enumerated:

- decline of unemployment level which could manifest as the consequence of workers emigration;
- deficit of workforce as a result of workforce emigration;
- the growth of salaries because of short supply of workforce;
- better working conditions as a result of employers wish to attract specialists;
- fluctuations of GNP which can be stimulated by the growth or decline of economy;
- aging population as a result of emigration of young people and families;
- tensions in the system of social security directly depend on aging population. The emigration of young people can stimulate total destruction of social policy. The size of persons who needs for the social support can excced working once;
- "brain drain" which is the most painful result of knowledge workers long emigration.

The Determinants Affecting Knowledge Worker's Decision to Migrate

International migration is influenced by many factors. However some may be more relevant for unskilled people than for highly-skilled migrants, particularly in the context of increasingly knowledge-based economies, the traditional push-pull framework identifies a number of factors affecting international migration. However, as Moguerou (2006) states, some specific elements related to the structure of national innovation systems might be more relevant for understanding the international mobility of knowledge workers in particular. The author emphasize that a push-pull framework is traditionally used by researchers to study international migrations. On the one hand, favourable conditions in the receiving countries, such as high salaries, high living standards, good work conditions and career opportunities, pull migrants to the receiving country. On the other hand, unfavourable conditions in the sending country push the highly skilled people to leave. Here Moguerou (2006) suggests some simple methods how to affect knowledge worker's decision to move. *First*, it is a necessity to eliminate income differences between home and destination country and to ensure relevant rewards for skills. *Second*, to create attractive labour market conditions. *Third*, coordinate immigration incentive policies. According to Mahroum (1999), immigration legislation remains very important in the international mobility of the highly skilled. Special legislation favourable to skilled immigrants are likely to allow countries to benefit from a growing international pool of knowledge workers. In addition to immigration legislation, other factors, such as taxation, openness in communication, business expansion overseas, safety, political determinants, are other important factors in the choice of migrants to relocate. *Fourth*, it is very important create stabile and efficient national innovation system and the agglomeration effects. The quality of research infrastructures, the financial support for academic research, research policies favourable to the development of R&D, or the reputation of universities or public labs, are some factors affecting the decision to migrate. High salaries, good opportunities for high-tech entrepreneurship, employment opportunities in

innovative sectors, the perspective of having a successful scientific career, are other factors outlined by the literature (Mahroum, 1999; Technopolis Group, 2001).

The private sector may also play a role in attracting foreign talents. The quality of research staff, working conditions and wages in the private sector are important factors. However, even in the private sector, reputation may have in influence on decision to move. Agglomeration effects and the existence of "knowledge intensive clusters" may be crucial in explaining the international mobility of knowledge workers in the context of increasingly knowledge-based economies.

Mahroum (1999) highlights the classification of knowledge workers or as he points – highly skilled migrants and types of influencing factors and policies of them migration (see Table 3).

Table 3. A Classification of knowledge workers mobility, types of influencing factors and policies (Mahroum, 1999)

Group	Type of push & pull factors	Type of policies
Managers & Executives	Benefits and remuneration	Business-oriented
Engineers & Technicians	Economic factors (supply and demand mechanisms) The state of the national economy	Immigration legislation Income tax
Academics & Scientists	Bottop-up developments in science Nature & conditions of work Institutional prestige	Inter-institutional and intergovernmental policies
Entrepreneurs	Governmental (visa, taxation, protection, etc.) policies Financial facilities Bureaucratic Efficiency	Governmental and regional policies Immigration legislation
Students	Recognition of a global workplace Accessibility problems at home Inter-cultural experience	Intergovernmental, and inter-institutional policies Immigration legislation

As the mapping of Table 3 reveals, different policies should be tailored out to suit the very different organisational and cognitive structures of the various sectors and professions. Various groups of professions are driven by different push and pull factors. Therefore, supplementary and complementary immigration and non-immigration legislation, such as income-tax allowances, investment capital tax relief, and copyright legislation should be introduced to encourage the inward flows of skills and expertise.

Recommendations for Actions in Order to Suspend and Attract Knowledge Workers

The governments particularly those of caching-up countries have to construct legal basis which would:

- stimulate "brain circulation" and temporary " brain exchange";
- suspend "brain drain";
- convert "brain drain" into "brain bank" and;
- retrieve "the brain" from foreign countries.

In order to achieve these tasks governmental policy of each country should be oriented to the:

- promotion of the development of human capital;
- development of friendly environment for the creation and application of new technologies;
- stimulation of cooperation of industry and research institutions;
- development of social dialogue in order to enforce society for the promotion of development of science and technologies.

Summarizing some recommendations could be proposed. Governments seeking to suspend and attract knowledge workers after they emigrated should normalize salaries; develop the system of R&D as well as higher education financing system; to stimulate cooperation of private and research sectors; create ICT clusters; to stimulate the brain mobility between academic and public sectors; to simplify the system of workforce mobility and; to promote scientists from other countries which estimates the social, economical as well as cultural processes of their country.

Conclusions

It was newly stated that knowledge worker is highly skilled individual who is able to convert knowledge, intellect, wisdom and ideas into tangible innovative product or service; he or she can create intangible products, to teach other people by transferring own competence and skills. Knowledge worker is not only who things how to work. Knowledge worker can use others intellect for the creation of innovative, value added products.

Knowledge workers are the main creators of KBE; and the effects of knowledge workers migration are particulary painful and sensitive for KBE evolution;

All occupation can be generally classified as professional 9high competence) workers and technical (highly qualified) workers depending on whether they are producers (knowledge and data workers) or users (service and goods workers) of knowledge;

Two types (compulsory and voluntary) and concrete motives of knowledge workers emigration were analysed. It has been discovered that the solution of individual to migrate or not to migrate depends on governmental actions. These construct the macro-economical situation in the country which affects the macro-sociological perspective for the choice to migrate or not to migrate. Micro-push-pull as well as macro-push-pull factors of individual migration are important because of physiological nature of these;

Effects of knowledge workers migration for "source" and "purpose" countries are different. Negative affect manifest when the "brain drain" occurs with the main consequences of "brain waste". However the "brain exchange" or "brain circulation" positively affects both "source" and "purpose" countries.

The main directions of knowledge workers migration: USA, EU, Canada and Australia. USA, Japanese and Korean emigrants represent a very small share of the total population. Emigration is particularly frequent from the United Kingdom and Austria, also common from Eastern Europe. The most benefit from the knowledge workers immigration receives United Kingdom, Sweden, Finland, and France. Nevertheless, the most knowledge workers emigration countries are Ireland, United Kingdom, France, Germany and Italy. Lithuania in many of cases should be interpreted as "source country" which feel economic and social damage because of "brain drain".

The determinants affecting knowledge workers decision to migrate are concerned with income differences; conditions of labour market; immigration incentive policies; stabile and efficient national innovation system. These factors should be efficiently regulated by proper governmental policy. Different types of policies should be applied to different groups of knowledge workers. For example, business-oriented should be applied for managers and executives; inter-institutional and intergovernmental policies should be applied for academics and scientists and etc.

References

Akkoyunlu, S. Migration and the Efficiency of European Labour Markes / Akkoyunlu, S., Vickerman, R. 2001. Prieiga per internetą: http://www.kent.ac.uk/economics/research/1europe/Akkoyunlu-Vickerman.pdf

Baldwin, J.R. A Firm-Based Approach to Industry Classification: Identifying the Knowledge-Based Economy / Baldwin, J.R., Gellatly, G. // Doing Business in the Knowledge-Based Economy / Ed. L.A. Lefebvre, E. Lefebvre, P. Mohnen. Dordrecht: Kluwer, 2001. P. 199-238.

Beckstead, D. Dimensions of occupational changes in Canada's knowledge economy, 1971 – 1996 / Beckstead, D., Vinodrai // The Canadian Economy in Transition Series, 2003. Prieiga per internetą: http://www.statcan.ca/english/research/11-622-MIE/11-622-MIE2003004.pdf

Bell, D. The Coming of Post-Industrial Society: A Venture in Social Forecasting. Harper Colophon Books, 1973

Brudek, J. East-West Migration in Europe, 2004-2015. Conclusions from Southern Enlargement. 26 p. Prieiga per internetą: (http://roses.univ-paris1.fr/evenements/dossiers_conferences/Conference_elargissement_2003/articles/26_JanaBruder.pdf

Castles. S. The Age of Migration / Casltes, S, Miller, M. 3rd ed. New York: The Guilfard Press, 2003.

Daugėlienė, R. Tendencies and prognoses for Knowledge-based Economy Development in the European Union // Legal, political and economical Initiatives Towards Europe of Knowledge. Proceedings / Ed. K. Kriščiūnas. Kaunas: Technologija, 2006, p. 24-35.

Docquier, F. International migration by educational attainment (1990-2000) / Docquier, F., Marfouk, A. // International migration, remittances and the brain drain / Ed. C. Ozden, M. Shiff. Palgrave – Macmillan, 2006.

Drucker, P. The New Realities in Government and Politics, in Economics and Business, in Society and World. New York, 1989. 276 p.

Ferro, A. Desired mobility or satisfied immobility? Migratory aspirations among knowledge workers // Journal of Education and Work. Vl. 19. No. 2. Routlege, 2006. P. 171 – 200.

Kriščiūnas, K. Žiniomis grįstos ekonomikos link: žinių raiška ir skvarba / Kriščiūnas, K., Daugėlienė, R. Monografija. Kaunas: Technologija, 2006. 225 p.

Lavoie, M. Employment in the knowledge-based Economy: A Growth Accounting Exercise for Canada / Lavoie, M., Roy, R. / Applied Research Branch Research Paper R-98-8E, Ottawa, 1998.

Lee, F. A quantitative assessment of high-knowledge vs. low-knowledge industries / Lee, F., Has, H.//

The implications of Knowledge-based Growth for Micro-Economic Policies / Ed. P. Howitt. Calgary: University of Calgary Press, 1996.

Lien, D. Brain drain or brain gain: A revisit / Lien, D., Wang, Y. // Journal of Population Economics. Springer–Verlag, 2005. 153 – 163

Lowell, B. L. Migration of highly skilled persons from developing countries: impact and policy responses / Lowell, B. L., Findlay, A.// International Migration Papers 44, 2001. prieiga per internetą: http://www.ilo.org/public/english/protection/migrant/download/skmig-sr.pdf

Mahroum, S. Highly Skilled Globetrotters: The International Migration of Human Capital. OECD / DSTI, Paris, 1999. 18 p. Prieiga per internetą : http://www.oecd.org/dataoecd/35/6/2100652.pdf

Massey, D. Worlds in Motion: Understanding International Migration at the End of the Millennium / Massey, D., Arango, J., Hugo, G., Kouaouci, A., Pellegrino, A., Taylor, J. E. Oxford, oxford University Press, 1998.

Moguerou, Ph. The Brain Drain of Ph.D.s from Europe to the United States: What We Know and What We would Like to Know. European University Institute. 2006. 41 p. Prieiga per internetą: http://cadmus.iue.it/dspace/bitstream/1814/4286/1/RSCAS+2006.11.pdf

Panesu, C. A. Brain Drain and Brain Gain: A new perspective on Highly Skilled Migration. 2005. Prieiga per internetą: http://www.cenpo.ro/files/08%20Migration.pdf

Rogoski, R. R. Knowledge Workers Top Company Assets // Triangle Business Journal, No. 19, 1999.

Sassen, S. Cities in a World Economy (Sociology for a New Century Series) (Paperback). London, Pine Forge Press, 1994.

Stark, O. Inducing Human Capital Formation: Migration as a Substitute for Subsidies / Stark, O., Wang, Y.// Journal of Development Economics, 2002. P. 29-46.

Straubhaar T., Brain Drain and Brain Gain in Europe – An Evaluation of the East-European Migration to Germany/ Straubhaar, T., Wolburg M.// Workshop on Managing Migration in the 21st Century: CIIP and Institute on Global Conflict and Co-operation at centre for US-Mexican Studies, San Diego, 1998.

Straubhaar, Th. International Mobility of the Highly Skilled: Brain Gain, Brain Drain or Brain Exchange. Hamaburg Institute of International Economics, 2000. 23 p.

Tam, M. Y. Organizational and Occupational Commitment : Knowledge Workers in Large Corporations / Tam, M. Y., Korczynski, M., Frenkel, S. J. // Managing Knowledge : An Essential Reader / Ed. by Little, St., Ray, T.). SAGE Publications, 2nd ed., 2005. P. 170 – 198.

Wolff, E. N. The Growth of Information Workers in the US Economy, 1950 – 2000 // Economic Systems Research. Vol. 18, No. 3, Routlege, 2006. P. 221 – 255.

Zhao, J. Knowledge Workers on the Move: perspectives on labour and income / Zhao, J., Drew, D., Murray, S. / Catalogues No. 75-001-XPE. Vol. 12 (2), Ottawa: Statistics Canada, 2000. P. 32-46. Prieiga per internetą: http://www.statcan.ca/english/studies/75-001/archive/e-pdf/e-0025.pdf

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