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WORK HUMANISM

Brain Circulation: Theoretical Considerations

Rasa Daugeliene, Rita Marcinkeviciene

Kaunas University of Technology
K. Donelaicio str. 73, LT-44029, Kaunas, rasa.daugeliene@ktu.lt rita.marcinkeviciene@yahoo.com

The migration of highly qualified persons is a natural phenomenon of this century which is called as knowledge society or knowledge economy era. There are many possibilities for people to study, work and live in any country of the world. Recently there was highlighted a new phenomenon of brain circulation in scientific works. Scientific researches theoretically attempt to describe the new tendencies of migration of highly skilled persons who are working in foreign country and then coming back to their motherland. It is important to stress that most scientists name this process as brain drain or brain gain. However, there is a gap in more detailed and specific explanation of this phenomenon. The authors call it as brain circulation. The research problem being solved in this article should be constructed: how to highlight the main theoretical features of brain circulation phenomenon in order to present hypothetical actions for stimulation of this phenomenon expression. The aim of the article was to highlight the theoretical features of brain circulation phenomenon and to suggest the hypothetical actions how to stimulate the brain circulation expression.

The article stresses that brain circulation being the phenomenon of knowledge-based society is a vital process for the nations as well as for the world's economy development. Human capital is one of the most important pillars sustaining countries economy growth as well as its competitiveness in the knowledge-based world.

Considering the aspects mentioned above, there was analysed many definitions of brain circulation phenomenon. As the conclusion of this analysis, it was pointed out that most of the scientists who investigated this phenomenon highlighted the same ideas concerning brain circulation. They named it as the mobility of highly qualified persons between motherland and foreign countries. This stimulates creation, dissemination, adaptation of new knowledge.

In order to crystallise new understanding of brain circulation process, there was highlighted the difference between such conceptions as brain gain, brain drain, brain exchange, and brain waste. The factors fostering countries economy growth where process of brain circulation is highlighted as well as the model of components which stimulate brain circulation was constructed and presented in the article.

The governments recognize the importance of human capital accumulation, its input into the nation's development. Therefore various programmes which help to attract the knowledge workers are implemented. Considering this the most successful brain circulation policies are analysed in this article. It is widely known that such Asian countries as India, Korea and Taiwan have experienced the exodus of their habitants. Therefore many qualified people have left their motherland. However these nations have managed to overcome this harmful phenomenon. They have created and implemented successful policies which have led to the brain circulation or even to the brain gain. The experience of these countries and the brain circulation policies applied with the purpose to attract scientists to work in these countries is presented as the best practice examples.

The manifestation of brain circulation phenomenon in Lithuania is revealed as well. There was made the conclusion that Lithuania has no coherent brain circulation policy. However, some rudiments of actions which stimulate the manifestation of brain circulation have been highlighted. Unfortunately they do not give the desirable changes in this field. As the outcome of theoretical considerations and analysis of best practise examples as well as presentation of situation's in Lithuania hypothetical actions for development of brain circulation in Lithuania were suggested in the article.

Keywords: *brain circulation, brain gain, brain drain, knowledge workers migration, brain circulation policies.*

Introduction

Actors in the developing economies must have the capacity to acquire new knowledge – to learn new ways of doing things – if they are to compete in the world economy (Kuznetsov, Sabel, 2006). It is widely recognized, that countries development depends on such factors as learning, researches, innovation creation as well as on collaboration with other countries. Isolated economy is not able to be advanced and competitive in the international level. Therefore, highly skilled human capital migration appears to be as one of the most important elements, contributing to countries economy progress. Over time this phenomenon was analysed in the context of brain drain and brain gain, but recently it is more appropriate to identify this process as brain circulation.

In today's knowledge society, although the one-way ticket still reigns, globalisation has made temporary workflows almost common-place. Brain exchange allows sending and receiving countries alike to benefit from the specialised experience of expatriate professionals – and not just from their remittances, considerable as these may be.

Many scientists analyse this phenomenon (Biao, 2005; Chacko, 2007; Daugeliene, 2007; DeVoretz, 2002; Gaillard, Gaillard, 1997; Helpman, 2004; Kuznetsov, 2006; Lee,

2008; Saxenian, 2005; Saxenian, 2002; Teffera, 2004; Tung, 2008; Vertovec, 2007; Yun-Chung, 2007; Zweig, 2008). They highlight that brain circulation is a vital process for countries economy development and also stress the need to accumulate highly skilled people. Scientific works point out that brain circulation replaces the concepts of brain drain and brain gain, whereas the migration of highly skilled persons increasingly grows. Consequently, nations create and implement programmes and initiatives with the purpose to attract not only their scientists working abroad, but also foreign researchers and thus to develop countries economy as well as competitiveness.

Considering above mentioned aspects the **research problem** being solved in this article should be constructed: how to highlight the main theoretical features of brain circulation phenomenon in order to present hypothetical actions for the stimulation of this phenomenon expression in Lithuania.

The **object of research** is brain circulation phenomenon.

The aim of this article: to highlight the theoretical features of brain circulation phenomenon and to suggest the hypothetical actions how to stimulate the brain circulation.

To achieve this aim, there are four **tasks** to be solved:

- To systemise the theoretical features of brain circulation phenomenon.
- To highlight the main peculiarities of brain circulation policies in India, China and Korea.
- To identify the actions of EU and Lithuania towards stimulation of brain circulation.
- To crystallise the hypothetical actions for development of brain circulation.

Research method: theoretical analysis of the scientific works in this field. Comparative analysis allowed crystallising the conceptual understanding of brain circulation phenomenon. Analysis of statistical data concerning highly qualified workers migration was applied as well.

Scientific originality and **practical significance** of the article is:

- Systemised theoretical features of brain circulation phenomenon.
- Highlighted importance of brain circulation process for the economy growth.
- Summarized the main peculiarities of brain circulation policies in India, China and Korea. This allowed systemising actions for stimulation of brain circulation.
- Presented situation of brain circulation in Lithuania and suggested hypothetical actions for the stimulation of this phenomenon expression in Lithuania.

Theoretical features of brain circulation phenomenon

International migration is an increasingly important issue for country's knowledge-based economy's development. As it is pointed out by Daugėlienė (2008), knowledge-based economy is a result of economic development due to the knowledge creation and application as well as globalization of the end of the 20th century, the result which, through expansion of markets and elimination of geographical isolation, changes not only economic cooperation, but also the mindset of societies and management principles. Kuznetsov (2006) maintains that the transition to the knowledge-based economy creates more integrated market for skills and especially for talents, highly qualified workers.

Similarly Le (2008) analyses the migration of knowledge workers and supplements the above mentioned idea with the statement that international labour movement may help transfer technology across borders in both directions: from donor countries to host countries and vice versa. The scientist highlights that this kind of migration creates brain circulation.

It is necessary to emphasize that brain circulation is a result of the development and alteration of brain drain and brain gain phenomenon. Many of scientists (Blitz, 2005; Kuznetsov and Sabel, 2006; Le, 2008; Saxenian, 2002; Tung, 2008; Yun-Chung, 2007; Teffera, 2004) stress that brain circulation replaces the traditional concepts of brain drain versus brain gain because of the growing mobility of human talent across countries boundaries. Biao (2007) states that since the topic of "brain drain" was introduced to the United Nations' debates in the late 1960s, policy thinking on skilled migration has shifted its focus from discouraging emigration in the 1970s to encouraging returns in the 1980s, and to facilitating "brain circulation" since the 1990s. Similarly Tung (2008) maintains that in the past there has been a tendency to talk about "brain gain" – whereby a country receives a healthy injection of human talent through immigration – and its converse situation "brain drain". The author highlights that now it appears more appropriate to view such immigration and emigration patterns in the context of brain circulation.

Yun-Chung (2007) analyses brain circulation phenomenon and stresses that in contrast to the one way "brain-drain" or "reverse brain-drain" theories, brain-circulation – a term coined by Saxenian – emphasizes the two way flow of skilled workers between home and host countries. Blitz (2005) also interprets this phenomenon from the same point of view. Considering the statements of the mentioned scientists, it could be stressed that brain circulation is premised on the claim that in an increasingly global migration market characterized by temporary movements of skilled labour, professionals may act as knowledge carriers and thus enable intellectual resources to be shared across states, rather than be permanently transferred from one state to another (Blitz, 2005).

Thus, there can be done an interpretation that professionals/knowledge workers are one of the most important elements, which show country's ability to compete in the global market. Moreover, they could be defined as the driving axle of brain circulation. Daugeliene (2007) points out that knowledge worker is a highly skilled individual who is able to convert knowledge, intellect, wisdom and ideas into tangible innovative product or service. The World Economic Forum also highlights the importance of knowledge workers and states that today's globalized economy requires economies to nurture pools of well-educated workers who are able to adapt rapidly to their changing environment (The Global Competitiveness Report 2008 – 2009).

The brain circulation phenomenon was also mentioned by Daugėlienė (2007). The author gives a framework, which shows the position of brain circulation phenomenon in the development of knowledge-based economy (KBE) presented in Figure 1.

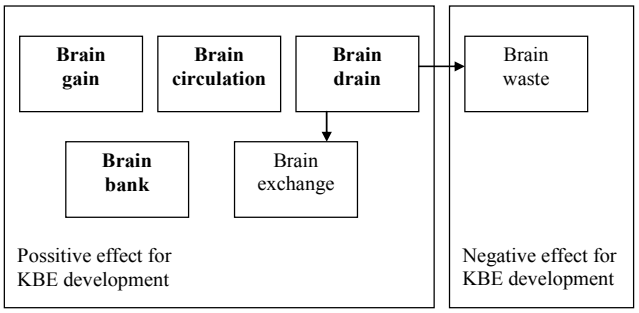

Figure 1. Knowledge workers migration consequences and effects for KBE development (Daugeliene, 2007)

The scientist stresses that brain circulation is a very welcome phenomenon in different countries, especially for those with low human capital potential and highlights that brain circulation can arise positive long-term dynamic economic as well as social effect.

It is necessary to amplify that there are many various factors fostering nation's economic growth, its competitiveness and in the same way stimulating country's socio-economic and socio-cultural progress (Fig. 2).

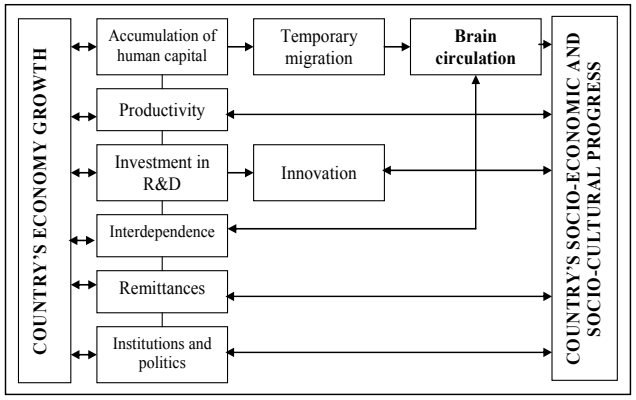

Figure 2. Factors fostering countries economy growth

The accumulation of human capital, productivity, interdependence, institutions and politics as well as innovations has a significant role while fostering countries economy development and competitiveness as well (Helpman, 2004). Blitz (2005) points out other important factors influencing nations' economy progress. The author highlights that the combination of temporary migrations, sustained investment in R&D as well as remittances being sent back home has led proponents of "brain circulation" to prove that the net result of such skilled labour flows may increase economic growth for both sending and receiving countries in the long term. This statement is maintained by Saxenian (2002) and Kuznetsov (2006) who stress that because of the manifestation of brain circulation phenomenon, high-skilled immigration increasingly benefits both sides and the global circulation of knowledge workers from poor economies to rich ones and back is opening new possibilities for economic development. Teffera (2004) supplements this idea and highlights that brain circulation is an emerging global phenomenon of significant proportion as it affects the socio-economic and socio-cultural progress of a society, nation and the world.

As the conclusion of the analysis made above there could be stressed that brain circulation is a vital process, which fosters countries competitiveness as well as world's economy growth in knowledge-based economy.

Yun-Chung (2007) analyses brain circulation phenomenon and points out that brain circulation theory investigated by Saxenian is primarily based on the experience of the Silicon Valley – Hsinchu[1] connection. It is highlighted that brain circulation theory has turned to a popular formula applied by many policy makers of latecomer regions trying to start the development of their high-tech industries.

It is important to comprehend what factors had an important impact for the emergence, manifestation and consolidation of brain circulation phenomenon. As Tung (2008), who devoted much attention to the analysis of brain circulation phenomenon, points out, brain circulation has become possible because of several important developments (Fig. 3):

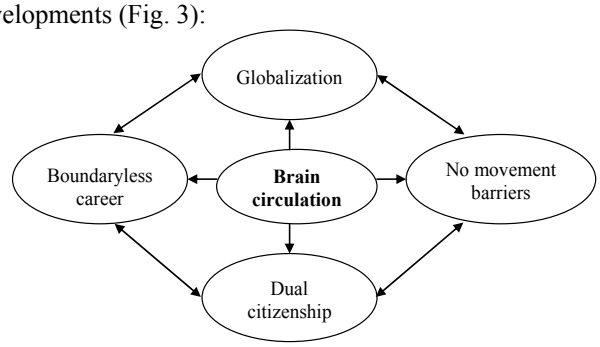

Figure 3. The model of factors which stimulate brain circulation

- Globalization: the growing economic interdependence has meant that countries around the world are more inter-connected than at any other previous time in history;
- the reduction in immigration and emigration barriers to the movement of people had made it easier for people to relocate across countries;
- growing number of countries, including US, Canada and many European Union countries permit dual citizenship, thus facilitating this mobility across nations;
- emergence of the concept of boundaryless careers where highly qualified people are increasingly willing to change jobs across international boundaries in search of more satisfying careers (Tung, 2008).

Yun-Chung (2007) stresses that there are four major structural factors of the brain circulation construction (Fig. 4).

The scientist analysed these four structural elements taking into account the fact, that highly skilled persons work in two different countries, places and these organizations must collaborate when stimulating brain circulation (in this case Silicon Valley and Hsinchu).

[1] Hsinchu (Taiwan) Science-based Industrial Park, established in 1980, is a state-of the art manufacturer of semiconductors, on par with the world market leaders in the US and Japan (http://www.geo.ntnu.edu.tw/faculty/ jinnyuh/papers/paper1..pdf)

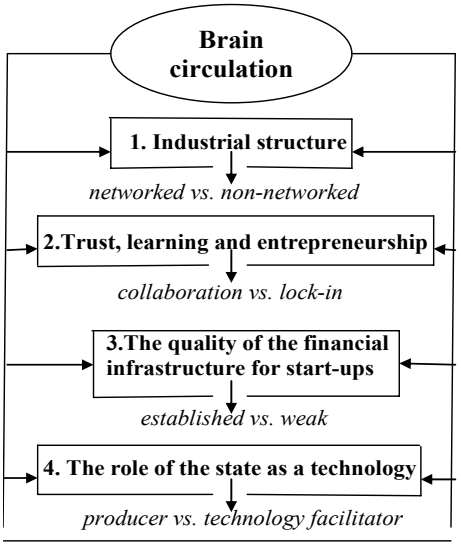

Figure 4. Structural factors of brain circulation (according to Yun-Chung, 2007)

Firstly, there should be a decentralized industrial system with strong division of labour and innovation among networked firms. Secondly, the agglomerated economies between the two places, organizations must encourage entrepreneurship and learning between the firms on the regional level. Equally, high-tech firms must try to avoid being locked into the social relations while continuing the collaborative division of labor and inter-firm learning in the high-tech sector (e.g. Hsinchu – Silicon Valley). Thirdly, venture capital is essential to technologically risky startups with super–profit compensation when it does Initial Public Offering (IPO) or is acquired by other companies. Fourthly, the role of the state in facilitating technology transfer must be significant. Governments should fund private sectors, because they put more emphasis on their activities in innovation, thus stimulating countries economic development, its competitiveness. Summarizing the analysis of this figure, it is necessary to highlight that the combination of these four structural elements could be a key of success while stimulating brain circulation phenomenon.

As the conclusion of the analysis of brain circulation phenomenon made above, there could be done a generalization, that brain circulation is a phenomenon which could be identified as the main, vital pillar as well as process sustaining countries knowledge-based economies development. Brain circulation is a multifaceted phenomenon, which covers the movement of highly skilled persons between different countries, institutions, with the main purpose to create, share, spread the knowledge and thus stimulate nations knowledge-based economies development. In the future brain circulation phenomenon will manifest with the greater power. Countries must put all the efforts while stimulating this process, because this is the key to countries development and competitiveness as well.

The peculiarities of brain circulation policies

As the world entered the XXIst century – knowledge-based economy era – knowledge creation and diffusion could be named as the engines stimulating countries competitiveness, economic growth. The accumulation of human resources can be interpreted as the main pillar sustaining this process. Thus, there could be highlighted that human resources, highly qualified persons/knowledge-workers are the factors of success when trying to stimulate country's economic development and its competitiveness as well. Each country must find the recipes of success how to attract, accumulate highly skilled workers and this can represent country's situation in a knowledge–based world.

The ability to attract talents to work to any country depends on many factors (Chacko, 2007; Mahroum, 2005; Gaillard and Gaillard, 1997; Zweig, Fung, Han, 2008; Suntharasaj and Kocaoglu, 2008). The country must be attractive for highly skilled workers and give them comparatively better conditions to work than he/she has now. But there is no one universal recipe which could ensure the success of the brain circulation policy. There is a necessity to subordinate many actions.

Many studies analyse the policies of brain circulation (Chacko, 2007; Vertovec, 2007; Tung, 2008; Mahroum, 2005). Brain circulation appears to be the rage in international policy circles. Vertovec (2007) stresses that a variety of policy-makers within national and international institutions are advocating measures to facilitate the movement of highly skilled migrants who are working both in their homelands and in foreign countries. Their main idea is that brain circulation systems could be managed in ways that bring proverbial "win-win-win" results (i.e. benefits for receiving countries through meeting labour market shortages, for sending countries through guaranteeing remittances for development, and for migrants themselves through offering employment and control over the use of their wages). The circulation of knowledge-workers is also being identified as a potential solution to a number of challenges surrounding contemporary migration (Vertovec, 2007).

There is a popular interpretation (Tung, 2008; Mahroum, 2005; Teffera 2004; Balaz, Williams, Kollar, 2004), that diasporas are one of the most important factor stimulating brain circulation as well as economics development. It should be stressed, that nowadays countries (e.g. France, UK, Germany, Finland, Denmark) create the policies which motivate highly skilled workers to return to their motherland and to adapt their skills, knowledge.

Teffera (2004) holds that communication technology plays a crucial role in the contribution of diaspora communities by facilitating their interaction and enhancing their involvement into their institutions at home, in the process catalyzing the brain circulation process.

It should be emphasized that brain circulation and brain gain policies applied by countries are closely connected, because they seek the same aim – to retrieve the talents or/and try to collaborate with their scientists living and working abroad. The wide range of brain gain policies which also stimulates brain circulation in the knowledge-based world is presented in Mahroum (2005) work *"The international policies of brain gain: a review"*. According to this author, different countries encounter divergent problems and brain gain policies must be directed to specific areas. There could be excluded two types of policies, where the target group is:

- country's citizens' abroad;

- all researchers regardless of their nationalities.

These policies can vary from immigration facilitation for researchers and highly skilled persons to tax discounts and easing of linguistic and other barriers. For some countries, the problem can be in the lack, or little, "internationalization" of the local research establishment (e.g. Germany, Finland, Denmark); while for others the problem is perceived as a classical "brain drain", the one in which financial returns and career rewards are the main drivers (e.g. Canada, France and the UK) (Mahroum, 2005).

Suntharasaj and Kocaoglu (2008) highlight that it is important to support human resource development in science and technology because this is one of the most important indicators when talking about country's competitiveness and also trying to stimulate brain gain and brain circulation.

The main peculiarities of brain circulation policies are explored when analysing the best practice examples of brain circulation. These examples illustrate countries success when choosing and adopting appropriate, effective of brain circulation or/and brain gain policy.

India, China, Korea is a good example of such success. These countries organized effective policies which helped to pull their scientists, researchers back to the motherland or to collaborate with the local actors, thus developing countries economy as well as competitiveness in the knowledge-based world.

During the 1970s and 1980s, there was concern that **India** was loosing its educated workforce to the West, particularly to the United States (Chacko, 2007). The author states that recently there is evidence that reverse brain drain is occurring, as the U.S. trained Indian professionals are returning to their home country in increasing numbers to take advantage of new growth and employment opportunities, settling in its large metropolitan cities. It is highlighted that cities like Bangalore, Hyderabad and the suburbs of Delhi and Mumbai have become magnets of returning Indian immigrants from the United States.

India's brain gain policy refers to above mentioned competitive cities – Bangalore, Hyderabad. They became salubrious for the returning IT, finance and management professionals for a number of reasons. Behrman and Rodinelli (2002) stress that in response to globalization, many cities develop specific cultures to woo high-tech professionals, investment and business (Chacko, 2007). This is the case with these two cities, where local governments, private and public sectors and skilled personnel converged to develop the economic bases, infrastructure and cultures necessary for their transformation and development. Bangalore and Hyderabad have acquired "trade recognition" as hubs in the Indian and global IT industry. Both cities have made significant investments in improving their digital infrastructure, developing Technology Parks and new residential townships on greenfield sites on the city outskirts to cater to their transnational industries and workforce. Returning immigrants who were a part of the "knowledge diaspora" bring skills, connections and capital that helped thrust the Indian IT industry to the forefront (Chacko, 2007).

China. For many years, China's government worried about the "brain drain". But beginning with 1992, China began to encourage students settled abroad to return for short visits and engage in various programmes on the Chinese mainland. Then, in 2001, the government adopted a new policy, encouraging overseas mainlanders to contribute to China's modernisation, even if they stayed abroad, and outlining various ways they could help China. This policy mirrors the strategies of other countries who encourage "brain circulation" and develop a "diaspora option" in order to overcome the loss of talented people. Gaillard and Gaillard (1997) stressed that the "diaspora option" reconceptualises the brain drain and the migration of scientific personnel, seeing it less as a permanent exodus or loss to the home country, but more as a form of "brain circulation", where talent goes abroad but information circulates back to the individual's country of origin. Through scholarly, business and educational exchanges, educational migrants who prefer to stay in the host country, are finding ways to participate in the economic and scientific development at home. In this way, scientific collaboration ensues without people in the diaspora uprooting their lives and moving back home (Zweig, Fung, Han, 2008).

In the work "Redefining the Brain Drain: China's "Diaspora Option" there is highlighted major policy documents on returnees (period 1988 – 2007). The main actions of China's government policy while trying to attract highly skilled workers are:

- creation of postdoctoral centres in order to attract overseas Ph. Ds to return for postdoctoral positions on the mainland;
- implementation of new regulations on "incubators" in hi-tech zones for overseas returnees;
- formation of research funds – funding returnees;
- establishment of world-class universities;
- formation of job introduction centres; preferential policies giving for returnees especially better living and working conditions;
- application of beneficial legislation system for a researcher;
- creation of good domestic conditions for returnees;
- implementation of programme "Serve the nation" without "returning to the nation" – a policy to encourage Chinese who remain abroad to engage in seven types of activities that can help China;
- establishment of regulations that simplify entry and exit for highly talented mainlanders and investors holding overseas citizenship;
- creation of technology parks for overseas returnees.

Korea's example. Suntharasaj and Kocaoglu (2008) in the work *"Enhancing A Country's Competitiveness through "National Talent Management Framework"* concentrate on the case of Korea, and present a study which shows that Korea is in the Brain Gain Status. In 1993, Korean students were the fifth largest group of foreign students in America. Currently, this trend is converse. The high rate of return of their highly skilled and educated scientists and engineers is the result of the booming economy and the better living condition.

The main driving forces for Korean's brain circulation as well as brain gain are listed below:

- Korea's economic development has grown for the past three decades and continued to improve;
- Korea's R&D expenditure (% GDP) has been increased

from 0.25 % GDP in 1963 and can reach 2.61 % GDP in 1994;

- changed industrial structure of the country: Korean Industrialization;
- Korean Government has adopted policy to utilize the needed expertise of Koreans abroad e.g. "Brain Pool" program, Korean Scientist & Engineer's organization aboard;
- the support from big Korean Corporations e.g. Samsung, Hyundai and Daewoo. They have accumulated the necessary resources and capital to invest in R&D and Basic Infrastructure.

Recently, Korean Government is not only trying to attract the highly skilled Korean professionals overseas but also fosters brain circulation and thus try to encourage the employment of foreign scientist in permanent research positions by introducing a "Green card" system.

The main actions for the stimulation of brain circulation process are to ensure communication of government, private sector and academic sector.

Identification of actions of the European Union and Lithuania towards stimulation of brain circulation

For many years labour migration within the EU was a very debatable topic. There were made many efforts to stimulate the migration within EU, but the result was not such as it had been expected. Dobson and Sennikova (2007) stress that the 2004 enlargement has changed the whole debate about labour mobility within the EU. For the first time in nearly 50 years, the EU has ceased to lament the failure of the 'fundamental right' to live and work in any member state because it has started to become a reality.

The main EU's initiative while trying to stimulate brain circulation in Europe and also to attract the knowledge-workers to this continent is the creation and development of European Research Area (ERA). The concept of ERA is presented in Fig. 5.

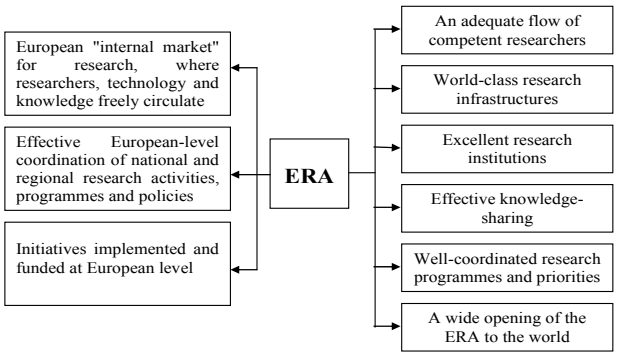

Figure 5. The concept of European Research Area

The essential ERA's aim is helping the EU to become a competitive knowledge-based economy in the world market and become the high-level attraction zone for researchers. Implementing Lisbon and Barcelona strategies the EU recognizes, that the increasing investments in research and innovation are effective only if there are sufficient and qualified human resources who are capable to absorb the increasing investment.

Green Paper on the European Research Area: New Perspectives provides many actions, while trying to achieve the goal of ERA's. These are:

- consolidation of fragmented EU Research area (including the establishment of European Technology Platforms, the ERA-NET scheme, the establishment of European Research Council, European Institute of Technology);
- research of infrastructure development while increasing investment (to increase the overall science and research spending to 3 % of GNP by 2010, and the decision to increase the budget of 7th framework program, compared with previous programs);
- increasing the desirability of scientists and researchers career (including both increasing funding for research, and European Research Council and the European Commission's recommendations on the Researchers Charter and Code of Employment Investigator).

The document "Brain gain and attraction program" highlights that in 2001-2005 European Council (EC) approved some documents and suggested various actions related with investigators mobility's fostering in the EU, as well as among the EU and other regions of the world. Also, in 2003, the EC has established European mobility portal (ERA-MORE). It gives information by internet to local and foreign investigators about career opportunities in the EU institutions which implement scientific research. In 2004, this portal was supplemented with international European mobility network centres. They give the information and practical assistance concerned with occupational and personal questions which arise to investigators. At the moment, this investigators mobility's network (more than 200 centres in 35 countries) is renamed to EURAXESS.

The problem of brain drain in Lithuania is obvious. The statistics shows that net migration in Lithuania during the period 2003 – 2007 was negative. Unfortunately, it is hard to measure brain circulation phenomenon, because there is no such statistical data. However, it is necessary to emphasize that there are many studies analysing brain circulation, brain drain in Lithuania, but the results of these analyses do not show the quantity of these processes. The surveys of brain circulation, brain drain are trying to find the answers to such questions as the motives stimulating the migration of highly-skilled persons, the push-pull factors for migration, the consequences of brain drain, brain circulation to the sending country, etc.

It should be stressed, that there is no coherent brain gain/circulation policy in Lithuania. For the programming period of 2007 – 2013 there are provided some measures which directly correlate while trying to implement brain gain/circulation. The Ministry of Education and Science with private enterprises founded grants point to the interest to manage brain drain and to maintain the relations with Lithuania scientists who are working abroad.

It is important to highlight that Lithuania's Minister of Education and Science certified "Brain gain programme" in 2008 November 20. Its purpose to encourage doctoral students and researchers, the citizens of Lithuania who live abroad, Lithuanian origin foreign researchers and other foreign countries researchers to associate to Lithuanian Scientific area, while collaborating with Lithuanian science

and studies institutions, organizations and investigators. There could be done a generalisation that "Brain gain programme" is one of the most oriented to the stimulation of brain circulation in Lithuania.

Hypothetical actions for the stimulation of brain circulation phenomenon

Concerning the best brain circulation practises, as well as the EU actions stimulating this phenomenon, there could be suggested hypothetical actions for the stimulation of brain circulation.

It is important to highlight that for small, developing countries like Lithuania, it is very difficult to compete with the countries, which are more developed and thus can suggest more attractive, suitable work, living conditions for researches. Lithuania should target its policy to brain circulation, rather than brain gain, because it could be bristled with difficulties while trying to hold the researches inside the country.

It could be generalised that the country's brain circulation policy can be successful if science policy allows not only to retrieve researchers working abroad but also to attract foreign scientists.

Table 1 shows the present programmes and actions fostering brain circulation in Lithuania. Also, after the survey of the most successful brain circulation and brain gain policies, there are suggested hypothetical actions for the stimulation of brain circulation expression in Lithuania.

Table 1

Present situation of the stimulation of brain circulation in Lithuania and hypothetical actions for the stimulation of this phenomenon expression

Present situation	Recommended actions
▪ Brain gain programme; ▪ Grants founded by The Ministry of Education and Science and private enterprises'; ▪ Researchers career programme actions: - "The grants for pulling high-level researchers and for their reintegration"; - "The short period visits of foreign researchers"; - "State aid to the recruitment of scientific in knowledge and technology-intensive enterprises". ▪ General national complex programme actions: - Qualifications' improvement of studies staff: mobility stimulation; - The grants for Lithuania international-level researchers; - Geographical mobility promotion of preparing and current R&D employees; - R&D thematic networks and scientific associations, academic institutions and research organizations and researchers activities strengthening while integrating into ERA; - The sponsorship of R&D activities in public sectors' research institutions and in higher educational institutions (very low, more theoretically); - The competition sponsorship of R&D activities. ▪ The establishment of technology parks (e.g. "Technopolis" in Kaunas city)	▪ To maintain the relations and to collaborate with Lithuania researchers working abroad – diasporas networks; ▪ To stimulate country's attractiveness for researchers; also to burnish general Lithuania image; ▪ To create the beneficial legislation system for researchers; ▪ To allow the dual citizenship for researchers and scientists – in order that they would serve to Lithuania development instead of relations rupture if there is no possibility to have a dual citizenship; ▪ To introduce the beneficial taxation system for researchers; ▪ To create good domestic conditions for returnees; ▪ To concentrate government actions on purpose to foster brain gain/circulation in Lithuania – find several areas where Lithuania scientists could compete and show the best results instead of trying to compete in many fields; ▪ To encourage scientists mobility in order to improve professional skills and to thus to avoid brain drain; ▪ To establish the world-class universities; ▪ To promote cooperation between universities, government and business enterprises; ▪ To attract foreign investors; ▪ To introduce the regulations that simplifies entry and exit for highly talented people and investors holding other countries citizenship.

Conclusions

▪ It has been *newly stated* that brain circulation is the phenomenon which fundamentally replaces the phenomenon of brain drain versus brain gain in globalized, knowledge-based world. Highly qualified persons are moving among different countries and institutions, thus acquiring, sharing, and spreading their knowledge. Brain circulation is one of the most important factors influencing countries economy growth and its competitiveness. It has been highlighted that the combination of industrial structure, trust, learning and entrepreneurship, the financial infrastructure for start-ups, the role of the state in facilitating technology transfer could be interpreted as the key to success while stimulating brain circulation. The conceptual understanding of brain circulation phenomenon is interpreted as the result of the evolution of brain drain and brain gain phenomenon.

▪ There was *concluded* that many nations faced the exodus of their highly qualified habitants, but just a few of them managed to swimmingly solve this problem and to pull them back to the motherland or maintain significant and close contacts with their native country. Korea's, Taiwan's and India's best practise examples in brain circulation policies were presented in this article. The analysis of these cases showed that governments made many efforts while trying to conquer or to diminish this problem. A number of actions were applied to stimulate brain circulation, beginning with the establishment of Technology Parks, significant investments in improving their digital infrastructure, and ending with the creation of beneficial legislation and taxations systems for researchers. It was also stressed, that scientific diasporas are an essential factor stimulating brain circulation as well as countries economy growth.

▪ It has been *shown* that Lithuania implements some initiatives, programmes in order to stimulate brain circulation. Despite Lithuania's government efforts to approve the *"Brain gain and attraction programme"* in 2008 (this programme is one of the most oriented to the stimulation of brain circulation), the implementation process of other programmes is not successful enough. They do not express expected results.

- The hypothetical actions for stimulation of brain circulation have been presented. Various types of activities, initiatives, programmes should be applied (e.g. permission to have dual citizenship for researchers, the establishment of world-class universities, close collaboration between government, business enterprises and universities) in order to attract highly qualified persons to work in Lithuania as well as to stimulate highly qualified Lithuanians to work with foreign colleagues. In such a way brain circulation process would influence the share of knowledge and, on the other hand, the growth of economy.

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Rasa Daugėlienė, Rita Marcinkevičienė

Protų cirkuliacija: teoriniai svarstymai

Santrauka

Norėdami konkuruoti pasaulinėje ekonomikoje, besivystančių ir išsivysčiusių šalių ekonomikos dalyviai privalo turėti galimybę pritaikyti naujas žinias ir naujus darbo metodus (Kuznetsov, Sabel, 2006). Pripažįstama, jog šalių ekonomikos vystymasis yra sąlygojamas šių reiškinių: mokymosi, tyrimų, inovacijų, taip pat bendradarbiavimo su kitomis valstybėmis. Izoliuotos ekonomikos valstybės nėra pažangios ir nėra pajėgios konkuruoti tarptautiniu mastu. Taigi aukštos kvalifikacijos darbuotojų migracija yra vienas iš svarbiausių fenomenų, prisidedančių prie šalių žiniomis grįstos ekonomikos progreso. Pabrėžtina, kad anksčiau šis reiškinys buvo analizuojamas kaip protų nutekėjimas ir protų telkimas, tačiau dabar tokį fenomeną labiau derėtų vadinti protų cirkuliacija.

Šį reiškinį analizuoja daugelis mokslininkų (Biao, 2005; Chacko, 2007; Daugėlienė, 2007; DeVoretz, 2002; Gaillard, Gaillard, 1997; Helpman, 2004; Kuznetsov, 2006; Lee, 2008; Saxenian, 2002, 2005; Teffera, 2004; Tung, 2008; Vertovec, 2007; Yun-Chung, 2007; Zweig, 2008). Savo darbuose jie pabrėžia, kad būtina šalyje kaupti aukštos kvalifikacijos žmogiškąjį kapitalą, ir akcentuoja, kad šalių ekonomikos vystymuisi yra svarbus protų cirkuliacijos procesas. Nurodoma, jog dėl didėjančių aukštos kvalifikacijos darbuotojų migracijos srautų protų cirkuliacija pakeičia tokias sąvokas kaip protų nutekėjimas ir protų telkimas. Šalių vyriausybės, suprasdamos šio proceso svarbą šalies ekonomikos vystymuisi ir konkurencingumo didinimui, kuria ir įgyvendina įvairias programas, iniciatyvas. Taip jos siekia pritraukti ne tik šalies mokslininkus, dirbančius užsienyje, tačiau ir kitų šalių tyrėjus. Atsižvegiant į tai, straipsnyje keliama mokslinė problema: kaip išryškinti pagrindinius teorinius protų cirkuliacijos reiškinio bruožus, pasiūlant hipotetinius veiksmus, kurie padėtų skatinti šio fenomeno raišką.

Siekiant išspręsti minėtą problemą, straipsnyje keliamas tikslas – išryškinti teorinius protų cirkuliacijos reiškinio bruožus ir pasiūlyti hipotetinius veiksmus, kaip skatinti protų cirkuliaciją.

Tikslui pasiekti keliami keturi uždaviniai: susisteminti teorinius protų cirkuliacijos reiškinio bruožus; išryškinti pagrindinius Indijos, Kinijos ir Korėjos protų cirkuliacijos politikų ypatumus; nustatyti ES ir Lietuvos veiksmus, skatinančius protų cirkuliaciją; išgryninti hipotetinius veiksmus protų cirkuliacijai skatinti.

Pirmajai problemai spręsti, buvo analizuoti Kuznetsov ir Sabel (2006), Daugėlienės (2007, 2008), Le (2008), Blitz (2005), Tung (2008), Teffera (2004), Saxenian (2002), Yun-Chung (2007), Biao (2007) ir kt. moksliniai darbai, taip pat Pasaulinė konkurencingumo ataskaita 2008–2009 m. Siekiant apibrėžti protų cirkuliacijos sampratą ir išryškinti šio proceso dedamąsias, pasiūlytas protų cirkuliacijos modelis, kuriame atsispindi šio proceso dedamosios. Išskirti struktūriniai protų cirkuliacijos elementai, atskleistas šio reiškinio vaidmuo šalies ekonomikos progrese. Atlikus mokslinių darbų ir studijų analizę, buvo prieita prie išvados, jog suvokus protų cirkuliacijos fenomeną pakito ankstesnis kvalifikuotos darbo jėgos migracijos suvokimas analizuojant protų nutekėjimo ir protų telkimo reiškinius. Konceptualus protų cirkuliacijos suvokimas yra interpretuojamas kaip protų nutekėjimo ir protų telkimo fenomenų evoliucijos pasekmė. Straipsnyje teigiama, kad šių keturių veiksnių derinys: industrinės struktūros kūrimas (kur bendradarbiaujančios įmonės dalijasi darbais ir inovacijomis), pasitikėjimo, mokymosi ir verslumo skatinimas, rizikos kapitalo pritraukimas, valstybių vyriausybių vaidmens finansuojant privatųjį sektorių didinimas (taip skatinant technologijų perdavimą), yra sėkmės faktorius, skatinantis protų cirkuliaciją.

Analizuojant mokslinius darbus, kuriuose nagrinėjamas protų cirkuliacijos politikos (Chacko, 2007; Mahroum, 2005; Gaillard ir Gaillard, 1997; Zweig, Fung, Han, 2008; Suntharasaj ir Kocaoglu, 2008; Vertovec, 2007; Tung, 2008; Balaz, Williams, Kollar, 2004), paaiškėjo, kad valstybės, suprasdamos šio reiškinio naudą šalies ekonomikai, jos vystymuisi, kuria ir įgyvendina politikas, galinčias pritraukti ne tik savo šalies mokslininkus, dirbančius užsienio šalyse, tačiau ir užsienio tyrėjus. Moksliniuose darbuose pabrėžiama mokslinių tinklų (diasporų) svarba skatinant protų cirkuliaciją. Indijos, Kinijos ir Korėjos protų cirkuliacijos politikos, išskiriant faktorius, lėmusius šio proceso skatinimą šalyse yra gerosios praktikos pavyzdžiai. Valstybių vyriausybės labai stengėsi ir taikė aibę veiksmų, kad skatintų protų cirkuliaciją šalyse. Buvo steigiami aukštųjų technologijų parkai, didinamos investicijos į skaitmeninės infrastruktūros tobulinimą, kuriami palankūs įstatymai ir specifinės mokesčių sistemos mokslininkams.

Siekiant išryškinti Europos Sąjungos (ES) ir Lietuvos protų cirkuliacijos skatinimo veiksmus analizuojamos vykdomos politikos ir iniciatyvos šioje srityje. Europos mokslinių tyrimų erdvė (EMTE) yra pagrindinė ES iniciatyva, kuri padeda skatinti mokslininkų mobilumą, protų cirkuliaciją. Pagrindinis EMTE tikslas – padėti ES tapti konkurencinga, žiniomis grįsta ekonomika pasaulio rinkoje, taip pat tapti aukšto lygio, mokslininkų traukos zona. Lietuvos vyriausybės 2008 m. patvirtinta „Protų susigrąžinimo ir pritraukimo programa" (t. y. labiausiai padedanti skatinti protų cirkuliacijos reiškinį), taip pat ir kiti vykdomi veiksmai ir iniciatyvos laukiamų rezultatų nerodo.

Siekiant pateikti rekomenduojamus veiksmus protų cirkuliacijai skatinti, atsižvelgta į gerosios praktikos pavyzdžių analizę šioje srityje. Sudaryta lentelė, kurioje atsispindi Lietuvoje vykdomos programos ir veiksmai, taip pat rekomenduojami protų cirkuliacijos skatinimo šalyje veiksmai. Lietuvos vyriausybė turėtų taikyti aibę įvairių programų ir iniciatyvų (pvz.: leidimą mokslininkams turėti dvigubą pilietybę, pasaulinio lygio universitetų steigimą, glaudų vyriausybės, verslo įstaigų ir universitetų bendradarbiavimą) siekdama pritraukti į šalį aukštos kvalifikacijos darbuotojus. Be to, būtina skatinti Lietuvos mokslininkių bendradarbiavimą su kitų šalių kolegomis. Taip, protų cirkuliacijos fenomeno raiška sąlygotų šalies ekonomikos ir socialinio gyvenimo kokybės augimą.

Raktažodžiai: *protų cirkuliacija, protų telkimas, protų nutekėjimas, žinių darbuotojų migracija, protų cirkuliaciją skatinančios politikos.*

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