

## **TRANSBORDER ECONOMIC GRAVITATION**

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### **ABSTRACT**

The aim of the paper is to present theoretical foundations of the analysis of processes of polarization of transborder regional development, explaining causes of these processes, forecasting of these processes, identification of medium and long-term effects, with particular emphasis on the cross-border economic and social gravitation. Special attention is paid to the influence of the development of cities, industrialized areas and infrastructural investments on the polarisation of regional development at the costs of the resources of less developed regions. It was indicated what actions should be taken into account in the policy of spatial development of the country in order to ensure sustainable optimal and balanced development of regions, with special reference to transborder areas.

The practical conclusion formulated in the paper is the necessity to take into account in the policy of sustainable regional development the phenomena of economic gravitation. In open market driven economy the regional and macroeconomic influence of transborder economic gravitation is growing. The decisions concerning national or transnational infrastructural projects aimed at regional development should take into account their impact on transborder economic gravitation and its effects on areas with weak gravitational strength. Monitoring of economic gravitation should be an integral component of official statistical programs.

**Key words:** economic gravitation, metropolisation, peripheralisation of the region, transborder economy.

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### **1. Formulation of the problem**

In a globalised world, most countries as political and socio-economic systems have the following characteristics:

- deep institutional interventionism in all areas of political, social, economic and ecological life, determined by laws and implemented by the bodies of the so-called democratic state based on law,

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- globalized, market-driven, knowledge-based economy, is becoming more and more opened on regional, national, transborder and global scale; the scope and forms of openness are determined by international and national legal regulations,
- social and economic development covering in all domains is determined by infrastructural regional, national or international systems; in some domains the infrastructural system are global or transnational, e.g. telecommunication, banking, transport,
- dependence of the functioning of governments, businesses, social services and households on modern information and communication technologies,
- self-governance at local and regional levels is generating tendencies to autonomy of territorial units of countries,
- growing economic gravitation, i.e. the impact of economies, regions, cities, industrialised areas with greater potential on areas with lower economic and social potential<sup>2</sup>.

In the conditions of development of the ICT, increasingly lower transport costs, economic liberalisation of international cooperation and deeper institutional interventionism, *economic gravitation* generated in economic and political centres located in cities and urban agglomerations becomes a factor determining regional development, specialisation, diversification and disproportions between and inside regions in geographical and geopolitical space.

This article deals with the verification of the following four hypotheses:

- In the modern open market economy, in the political systems defined as *democratic legal states*, the decisive influence on the development, differentiation and disproportions in development on the local and regional level and on the development of transborder economies has *economic gravitation* generated by cities and urbanized metropolitan areas where institutional, human and social capital is accumulated and by industrialized areas accumulating economic capital.

Metropolitan and industrialised areas base their development on the absorption and exploitation of mobile resources from external geographical environment.

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<sup>2</sup> The notions of *economic gravitation* and *economic tolerance* were introduced and defined as economic categories in: Oleński J., *Economic Tolerance*, *Gospodarka Planowa*, No. 8-9/1967. Measurement of *economic tolerance* ranges, definition of *economic gravitation* measures and their measurement and delimitation of *economic gravitation fields* became possible in practice only in the 1990s, when, thanks to information technologies, access to transactional (*big data*) and administrative data was gained, cadastral data and when a multidimensional spatial and temporal identification of economic objects and processes was made possible and statistical values of indicators reflecting the spatial transfer of mobile resources were calculated on their basis, the use of immobile resources by entities - residents of other regions or countries and the calculation of indicators reflecting the impact of economic potentials of various industries and regions on each other.

- The decisive influence on the formation of fields of economic gravitation of the metropolis and industrialised areas, and thus on the permanent effects of economic gravitation on the development and use of regional resources, has infrastructure policy, in particular the location of facilities and the creation of social and political infrastructure networks, the location of authorities and state administration, educational, scientific, cultural and health institutions, the development of industrial infrastructure and transport networks (road, rail, air, water transport networks). This policy is - or should be - conducted on a macroeconomic scale by central state institutions and on a local level by local government authorities.
- The "free market" is a bad regulator of sustainable regional development. Leaving decisions on the development of technical and social infrastructures to market processes, and infrastructure management to commercial entities, leads to permanent imbalances in regions, countries and internationally. This leads to a situation where metropolitan areas and larger cities become economic "black holes" sucking the resources from their social and economic environment. This results in the peripheralisation of regions located outside metropolitan areas and inefficient use of resources on a regional scale and, in the case of small and medium-sized countries, also on a macroeconomic scale.
- Therefore, in today's market-driven economy, regional development cannot be left to the so-called *market*. The market economy must not be confused with a *bazaar-economy*. The national economies and the regional economies cannot be seen by governments and businesses as proverbial oriental bazaars. The market is a good regulator, but only when we are dealing with setting prices on the local retail market, i.e. when it regulates local, short-term processes, purchase and sale transactions of goods or services in conditions of relative information symmetry of participating parties – consumers, small sellers, small intermediaries. The market, however, is a bad regulator of all processes in which social objectives or long-term economic objectives are taken into account. It is also a very bad regulator of all infrastructural processes and systems, as well as all long-term economic processes.
- The processes of economic gravitation in transborder economies are strongly influenced by institutional differences and potential differences in human, social, infrastructure and natural resources between regions located on the neighbouring territories of different countries.

The practical conclusion for central state bodies and for local authorities and local administrations having the influence on regional development is the need to take into account the phenomena of transborder economic gravitation and its long-term social and economic effects.

## 2. Economic gravitation as a category

Local and national metropolises and industrialised areas not only base their development on their own demographic, institutional, infrastructural, industrial and natural resources, but also, and often above all, on the resources of the surrounding regions.

In the conditions of an open market-driven economy and the influence of the effect of scale of technological processes and businesses, that determines the effectiveness of economic and social activity in many fields, the metropolises and industrialised areas are not able to create new or increase the existing potential of human, technical or natural resources on the basis of their own internal resources located in their territories.

Metropolises and industrialised areas produce around them fields of institutional, social, economic gravitation (abbreviated as *fields of economic gravitation*). Their development is based on the exploiting of the resources in the surrounding geographical space. They "suck" from the surrounding towns and cities and the non-urbanized areas that are situated inside their fields of economic gravitation, the most valuable human, institutional and natural resources needed by the governments and administrations, social service providers, entrepreneurs and other organizational units. They also benefit from infrastructural and industrial resources available in their geographical surroundings.

The use of the resources existing in external geographical environment of urbanised centres or industrialised areas is often not-optimal. Sometimes the exploitation of those resources is a kind of robbery. The point is that resources which could be used much more effectively in small towns and rural areas are transferred from these areas to the centres of economic gravitation, where they are used inefficiently. This results in a permanent increase of development disproportions between the city or industrialized region and other towns and villages in the region.

For example, a talented manager, a professional civil servant, a valued teacher, a gifted doctor, a talented artist, who, in a small town or village, is a member of social and cultural elite and can have a significant influence on the development of a town. However, after moving to a large agglomeration they become insignificant employees of large corporations or offices. Their transfer is

a big loss for local society and economy, while it brings an invisible, negligible added value to the human and social capital of a large city or metropolis.

Economic gravitation generated by social and economic centres (political centres, cities and urban agglomerations, industrial districts) may, under the influence of infrastructure projects, cause that social and economic effects for the region will be completely different than expected. Decisions concerning national or transnational infrastructure projects aimed at sustainable regional development should take into account their impact on the economic gravitation of the region and its effects on areas with weak gravitational strength.

For example, the construction of highways or the roads bypassing the medium and small towns and cities, usually are improving the living conditions of life of the population by "taking" the transit traffic out of town. However it usually results in a decline in the demand for services provided by local small and medium-sized enterprises to travellers that were passing through towns and cities before the investments. Therefore, before making a decision on the route of new transport routes the local governments should simulate, how many petrol stations, hotels and restaurants, workplaces in local services, will disappear or significantly reduce their activity after the ring road or expressway is put into operation. It is necessary to anticipate all consequences of changes of the infrastructure and to undertake compensatory measures to limit the peripheralisation of villages or towns that - after the infrastructure investment is completed - will suddenly be "far from the main road".

Therefore - for example - when deciding on large-scale investment projects, e.g. the construction of Via Baltica and Via Carpatia ("from Tallinn to Salonik", and in practice from St. Petersburg to Istanbul), it would be advisable to develop simulation models of the impact of this investment on the areas around it, the simulation of changes of strength and directions of economic gravitation impact between urban centres and other localities, which will result in an increased transfer of resources between localities located within the impact area of this investment. New delimitations of economic and social subregions and functional areas (e.g. new maps of local labour markets) developed on the basis of the economic gravitation models would be helpful for local, regional and central governments to formulate the policy of sustainable and harmonized development. Particular attention should be paid to models simulating the impact of this transfer on the development of transborder sub-regions around Via Baltica and Via Carpathia.

The models of transborder economic gravitation could be used by central government, administrations and local and regional authorities whose regions are affected by this transport infrastructure for taking better decisions on the

investments that should accompany big national and transnational projects – like Via Carpathia.

Simulative models of economic gravitation of regional and transborder areas would provide the knowledge helpful to identify the processes creating positive synergies between different investment projects, and forecasting the benefits greater than those that would be achieved only through new transport infrastructure.

For example, an interesting methodological and practically important research problem of transborder economic gravitation seems to be the elaboration of the simulative model of economic gravitation for Central Transport Hub planned to be built in Poland. This model could be helpful in comprehensive planning of investments accompanying this project, both on a local and supra-regional scale, including cross-border regions of Poland, Belarus and Ukraine.

In the conditions of modern industrial and information technologies, any economic or social decision concerning the creation and relatively long-term infrastructural changes in concrete geographical area should take into account its impact on economic gravitation processes and their manifold effects on regional, supra-regional and transborder development.

In order to ensure sustainable regional and transborder development, to prevent the occurrence of socially and economically harmful disproportions between various units of the settlement network resulting in sub-optimal use of resources on a regional scale and to make optimal use of the resources at the regional and transborder level, it is necessary for the governments to pursue an active, centrally programmed, long-term policy of harmonised, sustainable regional and transborder development.

The basis for centrally implemented regional policy undertakings is programming, planning, implementation and maintenance of the infrastructures of strategic importance for regions, transborder economies and country as a whole: institutional, social, technical, ecological and informational infrastructures.

The planning and development of all types of strategic infrastructures at the regional and transborder level is the task of central state authorities. Local and central governments should understand that all infrastructural projects, also the projects covering small territorial area, are of national social and political importance, not only economic. They cannot be left solely to the self-governments of towns or villages, to local, communal or regional authorities (in Poland – *poviat* or *voivodeship*). Moreover in market-driven economy the building and maintenance of any kind of infrastructural objects and processes

cannot be left in hands of short term profit-oriented businesses market, especially if the market functioning as a bazaar.

The location, construction, operation or management of any infrastructure segment or facility affecting the local or regional processes of economic gravitation must not be delegated to commercial entities. They should be strictly regulated by laws and supervised by the relevant central state authorities or their regional and local branches. Local governments and other social and economic subjects in the regions and in transborder areas should be obliged to actively participate in the programming, planning, implementation, operation and development of infrastructure. The harmonization of infrastructural initiatives covering transborder areas needs the orchestration of laws on international level.

The infrastructural potential of the region is concentrated in particular settlement units. The greatest concentration of this potential takes place in cities and industrialised areas. It concerns all types of infrastructure: technical, social, institutional and informational infrastructures.

In developed economies, because of the deep institutional interventionism in economic and social life, the institutional infrastructure is playing more and more important role. It is in cities, and not in villages or small towns, that the organisational units constituting the institutional infrastructure of the state are located. These are executive and judicial authorities, public administration, institutions fulfilling the obligations of the state in the scope of enforcement of obligations of citizens and enterprises defined by law, such as taxes, sanitary, technical and environmental standards, social and health care institutions, education, science, most institutions responsible for the security of citizens and the state, infrastructural mass media.

In the modern economies, the concentration of institutional, social and information infrastructure plays an increasingly important role in the concentration of factors determining economic and social development in regional and national metropolises.

Nationwide and transborder network infrastructural systems, such as energy, road and railway infrastructure, air transport, water economy, telecommunications infrastructure, are primarily focused on satisfying the needs and connecting urban and industrialised areas, which are areas of concentration and accumulation of all other types of infrastructure, such as social infrastructure including education, health care, culture, public services provided by the state apparatus, industries of infrastructural nature for the economy, such as banking, insurance, mass media. The information businesses creating the information infrastructure of the country, regions and transborder economies are also concentrated in the metropolises.

In the conditions of increasingly stronger influence of economic gravitation on regional and transborder development, the following theorems concerning regional policy in the modern open market-driven, knowledge-based economy are justified:

1. The development of metropolitan areas at the cost of exploitation of the resources of the surrounding regions is a process that has been taking place since the beginning of industrialization. Cities have always created economic and social gravitational fields around them and have based their development on the using external resources from their external geographical surroundings.
2. In the conditions of modern transport and ICT technologies the infrastructural development of the country, regions and transborder areas means that the cities grow up not only and not so much thanks their own human, ecological and technical resources, but on the exploitation of the resources of the surrounding settlements and smaller towns that are creating weaker economic gravitation.
3. Technological development leads to an increasing concentration of infrastructure facilities and systems in a decreasing number of urban units. As a result of concentration of different types of infrastructure in cities, the peripherisation of the areas located outside metropolises is accelerated. The differences between the centres of gravitation and the surrounding territories are growing.
4. Under the influence of economic gravitation there is an outflow of mobile resources from areas with a lower concentration of development factors and their transfer to the metropolis.
5. Technological, organisational and infrastructural developments changing the mobility of resource. The resources that were immobile become mobile in the past, are becoming mobile thanks to new technologies, especially transportation and telecommunication. The costs of moving the resources from peripherals to the centres of gravitation are decreasing. The resources are becoming mobile over longer distances, e.g. growth of the spaces of labour markets thanks to commuting and migrations causing the depopulation.
6. The concentration of the social and economic potential of a region or country in an increasingly smaller number of cities or urban areas is fostered by the development of regional and supra-regional technological network infrastructures, in particular transport, telecommunications, energy, social network infrastructures (e.g. health, education, culture) and access to environmental infrastructure.

7. The development of the transport, telecommunications and e-government technology and ICT systems results also in the concentration of institutional infrastructure in small number of cities. Concentration of institutional infrastructure means that the stakeholders of administrative procedures are forced to use the services generated by institutional and social infrastructure entities located often in distant cities.
8. The implementing of ICT in administrative, education, culture, in certain health services, information and communication services based on national, trans-national or global ICT networks and systems is affecting the concentration of providers of these services in a decreasing number of cities and metropolitan areas. In other localities, the entities providing these services are being liquidated. This process is accelerating and deepens the peripheralization of the external environment of the centres of economic gravitation.
9. In the modern knowledge-based economy, the technological changes of different types of infrastructures lead to increasing the spatial range of economic gravitation fields generated by cities or urban areas. The centres are increasing their gravitational power. The effect of that is the accelerated transfer of resources from larger and larger areas to urban and industrial centres.
10. As a result of the increase of power and scope of economic gravitation generated by urban and industrialized areas, the centres are transformed into mega-agglomerations. This is the consequence of the increase in power and the scope of impact of economic gravitation generated by urban areas. The fields of gravitation of metropolitan areas in many countries are covering even the entire national economies of medium size and the transborder areas of neighbouring countries. Mega-agglomerations in spatially large countries often are becoming the economic centres for entire national economies. In the countries, in which the mega-agglomerations are dominating, all other cities, urban areas and towns are subject to peripheral processes.
11. In regions where transborder social and economic processes play an important role, economic gravitation is often to large extent influenced by institutional, legal and political differences between countries and by current political decisions of governments of particular neighbouring countries. Because of strong influence of political decisions, the economic gravitation in transborder economies is very fragile. The directions, power and geographic space of the processes of economic

gravitation in transborder economies may be changed unexpectedly because of political decisions of central or local governments of particular country.

12. In transborder areas, the differences of economic potential and the institutional differences between countries can reinforce the impact of economic gravitation generated by neighbouring economic, social and political centres located in different countries. However, in the case of inconsistent, non-harmonized political regulations, they may also weaken this impact.

The dynamics of changes in these non-economic processes is much higher than the changes of economic and infrastructural factors. Therefore, the study of economic gravitation processes in transborder economies requires complex methodological approach that takes into account the impact of changes of political situation, level of harmonization of institutional factors, legal regulations and social relations between countries concerned in high uncertainty and uncomplete information on different national segments of transborder economy.

### **3. Processes of gravitational transfer of resources on regional and transborder level**

The concentration of infrastructures and resources in a small urban space and the intermingling of institutional, social and economic infrastructures create - sometimes seemingly- better security and development conditions for people and socio-economic actors. The subjective greater attractiveness of the city in relation to non-organised areas causes that people and organisational units constituting mobile resources of the region move from villages and small towns to cities, and from smaller towns to larger ones.

Mobile social, economic and natural resources "sucked" by the centres of economic gravitation are above all:

- a) intellectual human capital (educated people, especially those with valuable professional experience and skills),
- b) social capital (people with leadership attributes, social and political organisations, cultural institutions),
- c) managerial capital (skilled and experienced managers, decision-making centres of enterprises and other organisations),
- d) institutional capital (the units of governments and public administration),
- e) technological capital (mobile technologies and technological processes in innovative industries).

The concentration of institutional and social capital is of particular importance for the gravitational power of cities and the centres of economic activities. For many centuries, the main citygenic factors have been the governments and public authorities, first of all the central governments, but also regional and local authorities. Important local centres of economic gravitation were (and are today) also the objects of defence infrastructure of a country or region. The exception to this rule were the cities emerging on trade routes. Since the Industrial Revolution, concentrations of industrial objects have become the stimulators of the development of the centres of economic gravitation.

Currently, in the conditions of modern technologies, knowledge-based economy and services, industrial plants are not necessarily developed in the cities, but rather in the areas well communicated with political and managerial centres located in cities, creating the concatenated areas of their economic gravitation – concentration of institutional, human, social and industrial capital. Thanks to the concentration of human capital in large cities are political institutions, managerial centres of companies, economic and social organisations, shopping centres, companies providing specialized services. In large cities and in the areas of economic gravitation are more likely to develop the universities, research centres, cultural institutions and highly specialised health care institutions.

The transfer of mobile resources under the influence of economic gravitation generated by urban centres and metropolitan areas causes the polarisation of the development of different parts of regions. Therefore, in some countries, political authorities try to control the processes of economic gravitation, to influence the factors which the governments can control by laws, administrative regulations and decisions. For example central governments in some countries are choosing for the location of the centres of institutional capital not in capital cities but peripheral regions. E.g. government offices and other public institutions and the centres for the creation and use of human and social capital (universities, research institutes, institutions providing advanced social services, e.g. specialist medical care, cultural and art centres) are installed in peripheral towns.

Central governments interested in sustainable development of regions are conducting an active policy aimed at the optimal use of resources throughout the country, limiting uncontrolled processes of the transfer of mobile resources under the influence of the centres of economic gravitation. It strives to eliminate or at least limit the unnecessary, or forced by regional disproportions, transfer of resources from social and economic units located in the field of economic and social gravitation of cities to urban and industrial centres.

Unfortunately, only few countries and regions are really successful in effective control of the processes of transferring valuable mobile social and economic resources from the places with weak economic gravitation to metropolitan centres. Technological progress in recent decades is most often accelerating the polarisation of regions caused by "sucking" valuable mobile resources by centres with stronger economic gravitation.

*Infrastructuralization* of social and economic development, i.e. the determining impact of different types of infrastructures on the position of cities and towns in countries and regions, the concentration of infrastructural resources in cities, lead to the increasing of regional polarisation by depriving permanently the political, social and economic subjects located outside the centres of economic gravitation of their basic resources, especially the most mobile human and institutional capital. As a result of these processes, they may lose their capacity for further development in the future, even if new, objectively favourable technical, economic or environmental conditions are created.

For example, a region which, thanks to its tourist resources or natural assets, could develop its economy thanks to more easy access for tourists from distant metropolitan areas. That can be achieved by the construction of expressways and high-speed railways from metropolitan areas to that region. However the opportunity of development thanks to better communication with more developed centres will not be used if before the construction of modern transportation infrastructure the entrepreneurial and educated people were "sucked in" by these distant metropolises. To the contrary the building of new infrastructure linking the regions with the centres may fasten the processes of migration of human capital from region. A barrier to greenfield investments in small towns and villages can be the lack of employees who had previously left "for bread" to the towns and cities where they could find jobs often below their skills.

The effect of the gravitational impact of cities is the peripheralisation of the areas outside the centres of gravitation. This impact of gravitation centres is transforming the towns, settlements and local labour markets into peripherals in the economic, social and political sense.

The process of peripheralisation cannot be stopped or its effects mitigated without a relevant active policy of regional development conducted by the state consisting in the creation of institutional and social capital and infrastructural objects of supra-local importance in localities outside the centres of economic gravitation. Relying on the regulatory function of the market in the field of regional development by scientists is a methodological error and by politicians – a harmful naivety.

The policy of sustainable regional development in conditions of increasing influence of economic gravitation should be based on a good theory. What is needed above all is a system of scientific concepts that will create a good theoretical basis for identifying the processes of gravitation and their influence on the development of regions under conditions of development infrastructuralisation. It is important to identify and explain the cause and effect relations between infrastructural factors and the use and development of the resources, as well as the causes and effects of regional development polarisation. These are the following terms: socio-economic gravitation, field of economic gravitation, socio-economic asymmetry, economic black hole, political, social and economic environments.

Economic gravitation in knowledge-based, technologically developed, market-driven economy is of strategic importance for regional and transborder development. It should be taken into account in the analysis of all regional development processes, polarisation phenomena, explaining the causes of these processes, forecasting their effects, identifying medium and long-term results, in particular permanent consequences of spatial transition of resources. We would like to draw attention to the possible effects of the development of the centres of economic gravitation on the polarisation of regional and transborder development. We also point out the actions of governments and businesses that may ensure sustainable optimal regional and transborder development while developing the infrastructural systems in the areas of transborder economies.

#### **4. Empirical problems of identification and measuring of economic gravitation**

Economic gravitation is based on the fact that greater political, social and economic potential concentrated in cities, in urbanized areas or in industrialized areas. This concentration of capitals is creating relatively better, objective or subjective, conditions for the development of mobile potential and mobile resources located in other, dispersed locations in the region or country. The growing regional and transborder disproportions are causing:

- a) translocation of mobile resources in geographical space to centres,
- b) the inclusion of the resources located outside the centres of gravitation into social and economic processes and systems operated from those centres, without their physical movement in geographical space.

For example, the development of shopping centres on the outskirts of big cities creates a local labor market for people living in villages and cities located quite far from these shopping centres, but accessible via good roads or railways (e.g. malls outside big cities).

For example: the construction of dam on the river, the lake and the recreational facilities for the inhabitants of the nearby agglomeration is including the surrounding villages to the economic environment of big city.

For example, the building of the highway along the borderlines of countries is activating the processes of transborder cooperation of the regions on both sides of the border between countries (e.g. Via Carpathia in Central Europe)

Any social, economic or political organization oriented towards the development is aiming to increase its resources for disposal to get competitive advantage over other subjects or stabilizing its position on the political scene, in the market or in other areas of social and political life. The processes of increasing the potential and the resources for disposal are realized by investing in the qualitative and quantitative increase of their own resources (e.g. educating the staff, investing in modern technologies) or by obtaining resources from outside (e.g. brain drain, lobbying, creating transborder branches).

Political, social and economic units define their development strategy by the increasing their own resources as well as on acquiring external resources on the basis of economic criteria. In transborder areas the use of the resources located on other sides of the borderlines gives often higher effect of comparative costs and competitiveness.

For example, a company may develop its human resources potential by investing in the training of its employees or by recruiting school and university graduates and then training them to the extent and where they need to be in the company. But it can also - usually faster and cheaper – increase its human resources by attracting trained and experienced employees from other companies and towns, promising them more attractive working conditions. It can also strengthen its position on the market by aggressive negative advertisements and disseminating the “fake news” on its competitors.

For example, a political party may increase its political potential, i.e. the number of its supporters ready to vote for it in the next elections, by developing – with the help of specialists – reliable, socially attractive economic and social programs and keeping election promises made in campaigns. But on the contrary, it can try to gain an advantage over competitive political groups by reducing the number of the supporters of other competing parties, investing in aggressive propaganda that depreciates the trust to competitors, using all methods of psychological warfare in mass media, such as informational provocation, lies, slander, euphemistically called "fake-news".

In modern ICT environment the depriving of the competitors by fake-news disseminated in mass-media is effective and cheap. Another way for political parties to increase resources in political systems defined as *democratic states of law* is to attract people who have gained popularity in various fields through

their frequent presence in the media, especially television and tabloids (sport, mass entertainment, film, political activity in other parties), TV and Internet journalism, appearance in the public space thanks to scandalous behaviours, participation in events publicised by the mass media or so-called information provocations, i.e. dissemination of information in the form of images and sound edited with the use of information technology about events that never took place. In the conditions of modern ICT, the image and sound propagated on a mass scale can easily and cheaply influence the behaviour of many people.

Good example of positive impact of economic gravitation is the urban agglomeration or the capital city of a region that is developing its human and economic potential by creating favourable living conditions for its inhabitants and favourable conditions for the development of companies that have been operating in the city for years. It can also increase its human and social potential by attracting people even from distant cities and towns by investing in local universities, supporting research institutes and local businesses.

The disparities in living conditions and economic activity between urban centres and smaller towns recognised as peripherals in the region mean that the transfer of mobile resources from peripherals to the centres of economic gravitation does not entail almost any costs. The governments or self-governments of agglomerations may also create more preferential conditions for the so-called "foreign investors" than for the companies operating for years on the local market, illusory hoping to increase their potential by these "investors". That kind of the policy of upgrading the resources based on "foreign investors" was common in the countries of Central Europe in the beginning of the period of transition from centrally planned to market-driven economy, in early 1990s. For example, all Warsaw heat and power plants owned by the city government were "privatized", but in fact were taken by foreign state entities. In several other Polish cities the companies owned by local self-governments managing the municipal infrastructure of the agglomerations (water, sewage, heating, waste management) were bought by the companies owned by self-governments of German or French cities or other foreign companies in exchange for unfulfilled promises of modernisation investments and mythical know-how.

The transfer of human and social capital from the peripherals to the centres often means that the capacity of this capital is not used. For example, a specialist with higher education unlikely finds an attractive job in accordance with his or her education and intellectual potential a village or a small town<sup>3</sup>. If there is a need for people with such a profile and level of education in this town, such a graduate will rather be treated as a competition for other people with a similar profile. Discouraged by the lack of professional opportunities, he will probably

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<sup>3</sup> In German, the phenomenon of the lack of employability of an overqualified person is described by the good term '*Ueberkwalifizierung*'.

find a job in a nearby agglomeration, although his "added value" on the labour market of this agglomeration will be much smaller than in a smaller town. In transborder areas the stimuli of migration are much stronger if on one side of the borderline the salaries are lower and the unemployment is higher than in big city on the other side of the border.

Large agglomerations absorb human capital from outside, especially from transborder economies in a completely different way than small towns and cities. The larger is the city, the greater is the demand for educated people on the part of already existing companies and institutions, which want to increase quickly their human resources by employing new educated and skilled.

It happens that some professional corporations are blocking access to new specialists. The corporations of lawyers, engineers and technicians, medical professions, some trade unions are successfully trying to control the entrance of immigrants from peripherals and from abroad to local labour markets. In such situations, e.g. a lawyer may find employment outside the strictly legal professions, in public administration or in companies, whereas in his home town he will not find any work in the profession and at a level corresponding to his level of education.

This situation discourages local governments of smaller towns to support and finance the institutions building and upgrading human capital. For example, the local higher education institution in small town fulfils useful functions of education of youth living in that town. However, graduates of such school are often forced to look for opportunities for further development and work outside the town and region in which they were educated.

Human and social capital - educated people with social competences and leadership qualities - created in local universities are 'sucked out' by larger urban centres, including universities offering most gifted graduates the opportunity of further studies at masters and doctoral level. Graduates of these studies are rather easily absorbed by the labour markets of large cities, in which they obtained their bachelor's or master's degrees. They do not have the motivation for returning to their hometowns because they do not have the chance to find the workplace equivalent to their knowledge, qualifications and personality predispositions. So, they migrate to nearby agglomerations, although their value as human and social capital for their hometown or county would be much higher than in a large agglomeration.

The policy of local authorities and local governments managing the mobile resources in localities with low economic and social potential, and thus more valuable, is in practice not very often oriented towards creating and maintaining their own resources. Local governments and public administration (in Poland – the levels of *gmina* and *powiat*) do not generally pay sufficient attention to the

fact that their young inhabitants, gaining education and professional experience in other cities, are not motivated to return and serve the local community with their human capital.

It is not uncommon to observe the opposite phenomenon. For example, local professional establishment is reluctant to accept university graduates who represent a high intellectual potential, experience and professional status and who intend to return to their localities, especially those who come from outside. This establishment treats them more as competitors than as an enrichment of the human and social capital of a town or village. Such an attitude applies especially to professions organised in corporations and few, but highly qualified professional groups. However, big cities, including universities and large companies, are keen to employ outstanding graduates from outside these cities. The "pushing" of valuable mobile resources by smaller towns on one hand, and the "sucking" of these resources by the centres of gravitation on the other, creates powerful fields of economic gravitation that cover larger territorial areas crossing the borders of countries.

The asymmetry of different types of capitals – institutional, human, social, infrastructural, economic, ecological – between regions inside the countries and inside transborder economies is explaining well the shape of fields of economic gravitation, the directions and driving forces of transfer of resources inside those fields. The identification and measuring of asymmetries by official statistics shall help the governments and businesses to optimize their decisions and behaviour in the fields of economic gravitation.

The elaboration of methodology of measuring these asymmetries in transborder economies is new important task of statistics. The list of standard leading statistical indicators would be an important contribution of statistics to the governments and businesses operating in transborder economies.

The major force stimulating the migration and transfer of mobile resources of smaller towns to larger centres and in transborder economies is the asymmetry between potential economic and social opportunities for people, businesses, other institutions in large agglomerations comparing with the opportunities in small settlements. The bigger is the asymmetry of potential opportunities for the use and development of mobile resources between towns of different sizes, the stronger is the economic gravitation generated by large cities and industrialised centres and the larger is the spatial range of economic gravitation fields. The SWOT analysis seems to be useful approach for better understanding of the processes realized in the fields of economic gravitation.

In information society and knowledge based economy important is also the *subjective asymmetry* of institutional, human and social capital. The subjective asymmetry is the difference of SWOT characteristics between the centres and

peripherals of the fields of economic gravitation as it is seen by people representing human and social capital in peripheral regions. The *subjective asymmetry* depends on the information gaps of the people representing the capitals mentioned above. Stereotyped pictures of the centres creating the economic gravitation (big cities, developed countries, high level governments) are strengthening the propensity of mobile capital to migrate to the centres. Defining statistical indicators of measuring subjective asymmetry is an interesting theoretical and methodological problem for statisticians.

## **5. The impact of economic gravitation on the polarization in regions and transborder areas**

The processes of transfer, accumulation and centralization of the use of mobile resources of a region, country or transborder economy under the influence of economic gravitation forces generated by urbanized or industrialized centres have different range, power and run in a different way for different types of resources. The following types of the mobile resources are important from the point of view of the polarization of development of regions and transborder economies:

- A) Human capital
- B) Social capital
- C) Institutional capital
- D) Cultural capital
- E) Mobile industrial capital
- F) Mobile natural resources

Ad (A) Human capital

*Human capital* is the most mobile type of resources. The spatial movement of human capital is affected by four factors:

- (1) *Complementarity of human capital* in different areas of the settlement network of a region, country, transborder economy and on international scale. Leading factor of the mobility of human capital is the demand for a specific type of human capital in regional, national or international centres of economic gravitation. The complementarity of human capital generates economic gravitation, the stronger the greater the asymmetry between the development opportunities of people representing human capital in different localities. There is an asymmetry between the opportunities for the employment and development of skills of the people representing human capital (intellectual, managerial, experience)

in a village or town and the opportunities for development offered by the labour market in a large urban agglomeration.

For example, if a graduate of a university or vocational high school can count on employment opportunities in his or her hometown according to the level and profile of education, except the employment much below the level of skills any hope for promotion until the "boss" retires, then he or she will make every effort to take up any job in a larger urban agglomeration, even also below the level of ambition, hoping to find better opportunities for professional development and economic position in the near future. And if he (or she) is a graduate of the university in a large agglomeration, he will quickly resign from returning home and will look for any possibility of fulfilling his ambitions and expectations in that agglomeration during his studies. In a small town, the lawyer with no family ties to a local "establishment" has no chance of working in his educated profession. The only chance of making a carrier is to leave as soon as possible his small hometown for a nearby regional metropolis or even further away. The so-called "closed systems" in small local communities strengthen the influence of the economic gravitation of larger cities on these localities and even force the transfer of human, social and institutional capital from small towns to larger cities and metropolises.

- (2) *Information* on the demand for specific type of human capital in urban centres. This information is disseminated in the areas covered by economic gravitation of regional and national centres. Common access to internet increased the areas of economic gravitation fields of metropolitan centres and the power of impact on human capital. This information is creating *subjective asymmetries* between centres and peripherals.

Local governments and economic entities operating in towns with weak economic gravitation power should take into account impact of the "sucking" of valuable human capital even by geographically distant metropolitan centres. Counteracting the loss of human capital requires an active governmental policy of building equivalent conditions for human capital in peripheries and centres, to keep the inhabitants at home and acquire valuable human capital from outside. This can be achieved by developing local social and institutional capital (see below, points B and C).

- (3) *Costs of transfer of human capital* from small towns to the centres of economic gravitation and its *absorption* by the economy of the agglomeration:
- (a) costs of transport and commuting between peripheric localities and regional or transborder centres of gravitation,

- (b) removal expenses to a metropolitan area and staying (mainly the costs of accommodation) or commuting to work,
- (c) costs of adaptation to functioning in the social, economic and institutional environment of the metropolis.

In post-transition countries and in most of the developing countries the costs of moving human capital from the peripherals to the centres are almost entirely paid by potential employees who decide to change their place of work and residence. Employers and public institutions are involved in the transfer of human capital only in very exceptional cases. The participation of governments and businesses in the costs of transfer of human capital focused on sustainable development of local economies is applied only to the persons in certain positions and to specific skills. However the effect of that form of support is not always positive effect for building the capacity of human capital in local communities outside the centres of economic gravitation.

The costs of communication and human capital transfer in an open labour market depend on the access to the information and communication infrastructure. The construction of a highway or expressway connecting small towns and cities with the metropolis may affect not only the economic and social development of these towns and cities, but on the contrary – accelerate the sucking of human capital into the metropolis or include the town in the area of the labour market and commuting to work in the metropolis.

The decrease of the costs of transportation and commuting increases the area and strength of the influence of economic gravitation of bigger cities and agglomerations on the flow of human capital. The monitoring and statistical measuring of this phenomenon is important for the strategy of sustainable regional development. The point is to ensure that the development of the transport infrastructure does not cause the deepening of development disproportions, the drainage of human capital by metropolitan areas and the permanent peripheralisation of localities located in the area of economic gravitation fields extended thanks to the infrastructural investments, which were usually intended by local decision-makers to foster the development of these localities<sup>4</sup>.

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<sup>4</sup> Example from the Central Europe. Good case study would be the simulation and projection of the influence of Via Baltica and Via Carpatia on the economic gravitation fields of regional metropolises such as Białystok, Lublin, Rzeszów, as well as the cities on the western borderlines of Belarus and Ukraine, with reference to the flow of human capital between localities located in the area of these fields. Similar studies of economic gravitation fields would help to simulate and forecast the influence of infrastructural investments on regional development of transborder economies. For example, it would be interesting to examine the impact of the Warsaw-Białystok expressway opened in 2018 on the economic gravitation fields of these two agglomerations: strong

- (4) *The ability of agglomerations to create and absorb human capital.* It depends on the size and structure of the economies of agglomerations. In certain domains, even large agglomerations are unable to generate the quantity and quality of human capital necessary for the institutions and businesses in the agglomeration<sup>5</sup>. Moreover, in some areas there may be a kind of "overproduction" of a certain type of human capital, while in others there may be a lack of it.

For example, universities, public administration bodies or the media in regional metropolitan centres may have a shortage of qualified staff. These regional metropolises often do not invest in human resources development. On the other hand, the surplus of these staff may occur in other metropolitan centres, which have the educational capacity to train specialised staff at appropriate level to such an extent that they are unable to absorb these staff themselves. In such situations, the processes of interference between economic gravitation fields of two or more agglomerations may generate the *multidirectional transfer* of human capital between them.

The *diffusion of fields of economic gravitation* is another important research problem and an aspect that should be taken into account by politicians talking about sustainable regional development strategies.

## B) Social capital

*Social capital* is the demographic capital that is organized in groups of people and institutionalized organisations realizing social, political or economic goals or interests<sup>6</sup>. Social capital is formed by teams of people organised in a formal or informal way. The strength and scope of economic gravitation generated by these teams is determined by human capital organised, integrated and activated as social capital.

To activate individual human capital in the forms of social capital two conditions should be satisfied:

- first – critical mass of human capital, i.e. a minimal number of people who are ready to participate in social activities,

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agglomeration of Warsaw and weaker agglomeration of Bialystok. Another case study is the influence of the economic gravitation of the Berlin agglomeration on the depopulation of the surrounding areas of Brandenburg and on the development of the towns along the western borderline of Poland.

<sup>5</sup> For example, in many countries the capital cities concentrating the most of central governments, managerial centers of corporations, universities and research institutes are not able to produce sufficient quality and quantity of human capital from their own demographic resources.

<sup>6</sup> Fukuyama F., *Trust - social capital and the road to prosperity*, PWN, Warsaw 1997.

- second – organizations constituting the institutional capital; in small towns and villages it is usually a local parish, school, circles and associations organizing cultural, political or economic cooperation, in large cities – local organizations of inhabitants, branches of political organizations, fans of sport clubs, cultural societies, scientific clubs etc.

In information society, the social mass media and internet social portals create for individuals or small groups the opportunity to organize distributed human capital into different forms of social capital. The internet and mass media are increasingly important in organizing and activating social capital. Thanks to the mass media and the internet, social capital can be easily and cheaply organised locally as well as in regional, national, transborder or global social networks. Currently, the ICT technologies of organizing and activating social capital are widely used by political parties, organizations of minorities (e.g. ethnic groups), associations activating social capital focused on cultural or scientific goals, economic cooperation or living conditions of local communities.

Social capital aimed at achieving objectives for the public good of local communities is the basis of civil society and democratic state. Professional environments, especially those organised in the forms of corporations or associations, play an important role in the creation and development of new human capital. There is a feedback between social capital and the development of human capital. For example, universities are the centres stimulating the development of human capital thanks to the activity of social capital.

The potential of social capital in big cities is the factor attracting human capital from smaller towns and cities. These towns and cities lose – usually irreversibly – their small human and social capital. The bigger is the city, the more centres organizing social capital are absorbing human capital from its external environment.

In transborder areas the cross-border transfer of human capital to the centres of social capital refers to the domains of culture, research, education, high-tech branches of economy, organizations of entrepreneurs and local political associations, e.g. the Euroregions. Sustainable regional development requires the creation of network structures of social capital in all settlement units, regardless of their size. The mass media have the capacity of organizing human capital into the structures of social capital<sup>7</sup>.

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<sup>7</sup> Good examples of such social networks in Poland are the Circles of Friends of Radio Maryja or the Clubs of Gazeta Polska, which organize local social capital around important social and political goals, both local, national and transborder scale. The positive feature of these form of organizing social capital is that they do not generate the processes of human and social capital flows from villages and small towns to big cities. To the contrary, they stimulate the development of social and human capital on local level of villages and settlements.

In transborder economies the development of cross-border structures of social capital is the prerequisite of their sustainable integrity.

### C) Institutional capital

The factor stimulating the transfer of mobile resources of the peripherals to the metropolis is institutional capital. Management centres of political parties, business associations, trade unions, scientific organisations, professional associations and corporations, cultural and social associations, government administrations, as well as management centres of national and international companies, are usually located in national metropolises or in regional centres. These centres need human capital that is usually not sufficient even in large metropolitan areas or, if it exists, remains unidentified in the mass society of big cities.

Institutional capital generates the fields of strong economic gravitation that "suck" human capital and social capital, often from quite distant places. It is about the most mobile capital, and at the same time most valuable for small towns and villages - educated people with leadership traits and professional experience.

In the creation of the economic gravitation field, the institutional capital of governments, state administration, offices and the organizational units performing tasks of governments in the domains of safety, security, education, health care, culture, scientific research is of particular importance. Because of the power of economic gravitation generated by the structures of institutional capital, in some countries the central governments are implementing the policy of "decentralization of the state". The kernel of this policy is that some organizational units of central state apparatus or other important units of governmental sector are placed in smaller towns or cities, outside the capital city or biggest metropolises. The localization of those units in smaller towns not only creates more stable jobs, but also strengthens local field of economic gravitational stimulating the development of human and social capital and local labour market. The influence of the units of institutional capital covers much wider areas than the place or region in which the unit is based.

State-owned or state-managed institutional capital is the factor that is initiating, maintaining and rationalizing the exploitation of the resources at local level. Therefore, the economically rational relocating of organizational units constituting institutional capital from a smaller town to a larger town is a threat to the development of a smaller towns and leads to their peripherization. For example, the opening of a motorway or expressway from small town to neighbouring larger city may encourage local governments to the closing down of the vocational college in small town and moving it to the nearby larger city.

The improvement of transport infrastructure will cause that a smaller town will enter the strong economic gravitation field of a larger agglomeration. Reduction of institutional capital in smaller towns will strengthen the "sucking" of their mobile human and social resources – students and graduates, teachers, officers – and will reduce the share of education in local economy of smaller town.

In transborder economies the building of joint institutional capital by local governments of neighbouring countries is strengthening the cross-border cooperation of neighbouring countries.

In transborder economies the institutional capital created by the non-government organizations (NGOs) is of particular importance. Those organizations are most often financed by the governments or international organisations. However the headquarters of NGOs are located in the cities where the relevant state authorities and international institutions are based. Creating institutional capital in small towns in the area of transborder processes is an effective way of creating more favourable conditions for sustainable regional development and of weakening the negative impact of economic gravitation of larger cities and metropolises on the *sucking* of the resources of smaller towns and peripheral areas.

The policy of creating and maintaining institutional capital adequate to the needs of the settlement network is the basis of the policy of sustainable regional and transborder development.

#### D) Cultural resources

Cultural resources of regions are concentrated mainly in larger cities. The creation and maintenance of cultural resources is strictly related to the activities of cultural institutions, research and education. These institutions are located mainly in larger urban centres. Participation in culture is also much more intense in metropolitan cities than in small towns.

The creation of cultural resources is connected with the existence of creative human and social capital. The capacity of this capital necessary for the development of cultural resources depends on the domains of cultural activities. It is different in the case of maintaining an opera or philharmonic hall, and different in the case of a local cultural club, amateurish theater or local ethnographic museum.

The functioning of cultural institutions and related creative environments requires stable funding and organisational support for the participation of local society in cultural events. An important form of cultural activity are mass cultural events in small towns and cities that are becoming the landmarks of the

city, and through the mass media promote the town and region also in national, transborder and international scale.

It should also be noted that the places of religious cult, monuments of sacred architecture and pilgrimage places are a great and valuable cultural capital for many small towns and villages. The value of these places and monuments should be perceived not only from the point of view of the economic effects of the pilgrimage movement for local population, but above all as a permanent, immobile social and human resource of a town or place, around which the whole local region is developing in a sustainable way.

It is recommended to study the experiences of the Middle Ages, when the cultural, scientific, social and economic development concentrated around monasteries, often built in unused space, outside the seats of rulers and commercial cities. Medieval monasteries in Europe are the proof that the concentration of even a small human, social and cultural capital, if properly institutionalized, can be the strong driving force for harmonious, sustainable regional development. It is also important to note that the religious cultural resources are generating transborder social and economic links and processes. Medieval Ireland is good example of successful implementing of the model of development based on institutional, human and cultural capital of Latino-Christian civilization.

The cultural resources and activities have the ability to create powerful fields of economic gravitation using relatively small outlays. Cultural institutions and creative branches supported by social capital provided by such organizations like research institutes, secondary and university education, social services, are absorbing and stimulating the development and upgrading of human capital. That facilitates economic activities in various fields of culture. The supporting cultural institutional capital and cultural environments by local administration is an effective and cheap tool for promoting sustainable regional and transborder development.

#### E) Industrial capital

Industrial resources are technical infrastructure and fixed assets for industrial activities. These resources are the basis for creating economic potential and the labour market only if market conditions allow them to be used efficiently to produce these resources.

In the European and Asian countries which underwent political and economic transition after 1989, some industrial resources in many towns and cities became no longer effective for production purposes. The transition has changed dramatically the fields of economic gravitation that in the past were generated by the centres of industrial capital. For example, in Poland as a result

of the so called *shock therapy*, the economy suffered exceptionally huge losses in the use of industrial resources and in the industrial substance. The artificial bankruptcies of many industrial plants were particularly acute in small and medium-sized towns; often the bankrupted plant was only one industrial plant – the main employer contributing to the budget of local government. As a result of the bankruptcy of industrial plants, these towns lost their function as local centres of economic gravitation that were creating a labour market for the population of the surrounding settlement network and the conditions for the social and economic development of the subregion.

Nowadays, nearly 30 years after the *shock therapy* disaster, sustainable regional development requires an active state policy to rebuild local economic gravitation centres at regional level. The basis for this policy is the reindustrialisation of the economy at the local level, oriented towards the optimal use of all types of local capitals and resources. The reindustrialisation is also taking into account the creation of economic gravitation of localities to prevent the "sucking" strategic mobile resources from smaller towns by larger urban centres. The re-building of local industrial capital is the creating of conditions of development of local human and social capital. The people living in small towns and villages who represent these capitals should not be forced to look for a place to achieve their economic and social goals in other centres.

#### F) Ecological resources

Ecological resources are mostly immobile. In the policy of sustainable regional development based on the creation of economic gravitation fields at local level, two types of ecological resources are distinguished:

- (a) ecological productive resources,
- (b) ecological non-productive resources.

Ecological productive resources are the natural resources used in the process of industrial production (mineral resources, natural resources, investment areas, water resources used for production purposes). Ecological non-productive resources are resources that the basis and prerequisite of the services such as tourism, leisure, health, education and cultural services.

In practice, there are often conflicts of interest between the exploitation of the same natural resources for production and service purposes. The basis of the policy of sustainable regional development is the comprehensive, long-term economic projection of profitability of exploiting these resources for various purposes.

In today's economy, where services are increasingly important, the use of natural resources for service purposes is usually associated with the generation by regions equipped with these resources of economic gravitation attracting

users of these resources. Regions attractive for tourists generate economic gravitation attracting the inhabitants of agglomerations. The strength of this gravitation depends primarily on the income of the metropolitan population and the accessibility of tourist regions in terms of time, cost and access conditions.

In open, globalized economy the models of economic gravitation are necessary for the elaboration of the strategies of regional and transborder development<sup>8</sup>.

## 6. The syndrome of economic black hole

Big cities and metropolises generate strong fields of economic gravitation "sucking" the mobile resources from the surrounding regions. In the conditions of technological progress and infrastructural development, the gravitational fields that drain the resources from their environment are becoming stronger. The spatial range of their impact is increasing. This drainage concerns all resources, all types of capital that can be useful for the centres of economic gravitation. The specificity of drainage in the economic gravitation fields of large cities and agglomerations is its robbery in the sense that capital and other resources are "sucked" from the environment by the centres regardless of the value of these resources for the regions from which they are obtained.

For bigger cities and agglomerations, for businesses and institutions located in metropolises, any resource and capital valuable for a small town is an insignificant added value. For example, a good, gifted specialist in budgeting in local government of small settlement is a valuable human capital that ensures proper management of the public funds of a town or county. The same specialist, encouraged to be paid better in a big city to become a so-called advisor in a local branch of a bank, is of marginal importance both to the corporation in which he is employed and to the city, in which he decided to live. Therefore, the loss suffered by local government of small town as a result of "sucking out" this specialist by the gravitational field of the city's financial institutions is much greater, often many times greater than the benefits gained by the corporation in a big city. Small economies lose much more than big cities gain. General balance of economic effect of transfer of resources caused by economic gravitation is negative for national economy.

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<sup>8</sup> Example: The region of Mazury Lakes in Poland. The analysis of economic gravitation fields of Warmia and Mazury could show that nowadays, since the reconstruction of industrial plants, the more effective way to reduce unemployment in Warmia and Mazury is to complete the construction of expressways to Masuria from Gdansk and Warsaw, to launch a year-round attractive tourist services offer for families with middle and lower incomes and to implement tourist information systems enabling the use of year-round weekend tourism.

It often happens that public institutions of metropolises apply the drainage of human, social or institutional capital from other public institutions in small towns of the region, depriving them of unique resources that condition not only the development, but also sometimes the proper functioning of these institutions.

The deep asymmetry between the losses of the peripheral regions and the gains of the metropolitan centres from the drainage of the region's resources is not only an important research problem, but also a political dilemma. The asymmetry between the losses suffered by small towns and cities as a result of the transfer of valuable resources to metropolitan areas under the influence of their economic gravitation, and the benefits that this agglomeration and its entities derive from the acquisition of these resources, points to the need to study the comparative costs of economic gravitation.

The deprivation of small towns of valuable mobile resources by centres of economic gravitation justifies the definition of the impact of large metropolises on their environment as an *economic black hole*. The term "*economic black hole*" can hardly be considered as an official scientific term in economics and statistics. It seems, however – referring to the common knowledge of astronomy – it reflects well the essence of the influence of metropolises on their surroundings. Big metropolises are economic black holes for their external environments.

The metropolises generate around themselves strong, vast fields of economic gravitation. All mobile resources found in external geographical environment, that are useful in the metropolis and that are inside the fields of economic gravitation, are absorbed by the metropolises. Sooner or later around the metropolises, in the areas of economic gravitation, it is created the space of shortage of all mobile resources valuable for the economy of metropolis. Small towns and cities are deprived of educated human resources because the inhabitants of these towns and cities do not return to them after graduating from secondary schools or universities in other towns and cities, because they "have nothing to return to". The institutions originally located in smaller towns, are eager to change their location and move to metropolitan areas.

In a metropolis enriched with new human, social and institutional capital and mobile industrial capital, more and more economic and social activities can be developed. For that an additional geographical space may be needed to carry out this activity. The metropolitan city transforms itself into an agglomeration and gradually into a mega-agglomeration. The size and shape of agglomeration and mega-agglomeration is largely determined by the communication infrastructure delimiting regional labour markets and industrial zones operating within the agglomeration.

The efficient functioning of agglomerations and mega-agglomerations requires adequately developed urban and municipal infrastructure. The maintenance of this infrastructure requires additional human, industrial, energy, environmental, communication, social and environmental resources. This in turn requires additional human, economic and technical resources. As it was mentioned above, a metropolis works like an astronomical black hole. The greater its economic potential, the more resources it needs to acquire to maintain and develop it. The space of the economic gravitation field and the gravitational power of the metropolis are expanding. In consequence the valuable resources are being deprived of the increasingly distant localities.

A metropolis becomes an *economic black hole* for its surroundings after exceeding a certain size of demographic potential, social capital, institutional capital and urban resources. Therefore, the study of the processes of obtaining by national and regional metropolises the attributes of economic black holes harmful to the regions and transborder areas is essential for regional and urban development strategies.

Cities that influence their surroundings like economic black holes influence the development of the whole regions and limit the effectiveness of the sustainable development policy of the whole territory of country, as well as of transborder areas. For example, it is likely that a university, social institution or production facility located in small town covered by strong gravitational field of a metropolis that has the attributes of an economic black hole will sooner or later be relocated to an agglomeration or, in the case of immobile resources, their development will be limited by the outflow of mobile resources, especially human, social and institutional capital, to the metropolis. In open market-driven economy these processes are crossing the borderlines, covering all areas of transborder economies.

The syndrome of the *economic black hole* consists of the following processes:

- The metropolis generates such a strong field of economic gravitation that the localities that are in the area of its influence do not have economic and technical possibilities to prevent the transfer of all useful mobile resources, especially intellectual, social and institutional resources.
- The metropolitan area expands its space to include the non-mobile resources useful to the metropolis, such as industrial resources, natural resources useful as recreational facilities for the metropolitan population, areas for the services that can be located outside central metropolitan areas.
- The transforming of a metropolis into an agglomeration increases the field of economic gravitation and the force of its impact on areas outside it.

The effect of the increased impact of economic gravitation is the creation of areas outside the agglomeration deprived of the resources necessary for their independent development. Outside the agglomeration, the area with significantly reduced economic and social activity is created. Only smaller towns that are located far from the economic gravitation of the agglomeration, have the possibility of independent sustainable development.

- The development of transport and telecommunication infrastructure is conducive to increasing the spatial range of economic gravitation fields of agglomeration, to increasing the power of access on mobile resources and the relocation of these resources from more and more distant towns and cities to the metropolises.

The analysis of experiences of the countries where regional development has been left to the so-called free market shows that the lack of active regional policy of central governments has led to the emergence of multi-million mega-agglomerations with many negative social, economic and environmental phenomena. Mega-agglomerations also have a negative impact on the sustainable development of other regions of the country, not only small but also medium-sized. Mega-agglomerations often become economic black holes for the surrounding large areas. The impact of their gravitational fields leads to the polarization of the development of regions, and crossing the borders of countries.

It is reasonable to argue that the condition for sustainable regional and transborder development that supports optimal use of all resources without the need for their economically and socially unjustified relocation is that the governments pursue an active policy to prevent the emergence of economic black holes. The distribution of institutional capital ensuring the "resistance" of smaller settlements and towns to the negative impact of the agglomeration's economic gravitation fields is an important tool in hands of regional and central governments. International harmonization of the creating and distributing of institutional capital in transborder economies is the prerequisite of control of transborder economic gravitation.

## **7. Concatenation and diffusion of fields of economic gravitation**

The phenomenon which is important for the harmonisation of regional and transborder development is the diffusion of the fields of economic gravitation. The point is that a relatively short geographical distance between two or more urban centres or industrialized areas may result in concatenation, i.e. "overlapping" of economic gravitation fields. The result of concatenation of

economic gravitation fields, there are changes of flows of mobile resources between many urban centres, industrialised zones and external environment. These flows are multilateral and multidirectional<sup>9</sup>.

There may be positive synergies between such urban centres, such as the creation of a common labour market, joint infrastructure investments whose effects serve the entire sub-region, institutions serving two or more centres.

The impact of concatenation of economic gravitation fields on the development of bipolar or multi-polar spatial structures of regions should be analysed from the point of view of three aspects:

*Institutional aspect.* It concerns the political and institutional readiness of local authorities and institutions to cooperate with their counterparts from neighbouring centres, to implement joint infrastructural projects and to exchange complementary mobile resources. The concatenation of fields of economic gravitation from institutional point of view may lead to the creation of common institutional capital. However, from the point of view of so-called *political will*, the competition between centres may be harmful to all. E.g. the efforts to take over an important regional institution from one city to another, struggle to obtain better budgetary funds for investments at the expense of another city. Good cooperation of self-government authorities and institutions representing different centres of one agglomeration is a condition for obtaining the positive synergy effect for all centres creating concatenated fields of economic gravitation.

*Economic aspect.* Under the influence of concatenation of economic gravitation fields, the enterprises may use the area of these fields as a single market, as a common economic resource, the development of which is in the interest of all entities operating on it. The prerequisite of the effect of positive economic synergy and the effect of the economy of scale is the implementation of joint infrastructural projects stimulating full diffusion of economic gravitation fields. For example, the building of common transportation infrastructure, common scientific and research base, common health care infrastructure, specialised education, safety and security system, creating cooperative links between businesses, common information infrastructure of governments and businesses.

*Social aspect.* The effect of the concatenation of economic gravitation fields of two or more centres is the intensification of migration of population, of human and social capital. These migrations mean not only the relocation of inhabitants, but also the loss of human capital by the emigration centres, and the

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<sup>9</sup> For example, in Poland, in many regions of the country, there are the situations in which urban centres generating the fields of economic gravitation around them are located so close to each other that these fields are overlapped. Such situations can be observed in almost all regions. Two, three or more towns and cities are integrated into one multi-centric agglomeration.

enrichment of human capital by the immigration centres. The negative effect of migrations caused by the concatenation of economic gravitation fields in urban centres is the social disintegration, weakening of human capital both in centres from which people emigrate and in immigration centres.

The emigration of local social or political leaders to larger centres weakens the social capital of a smaller towns much more than it enriches the social capital of the agglomeration as a whole. On the other hand, the large scale of immigration to a large city or agglomeration contributes to the disintegration of the social capital of these agglomerations<sup>10</sup>.

In the case of complementary mobile economic resources, the mutual, multi-directional flows of different resources are beneficial for both regional centres and promote the development of the region as a whole. In the case of substitutional resources, however, the stronger field of economic gravitation effectively weakens the development potential of centres with weaker fields of gravitation.

To achieve the synergy effect of concatenation of economic gravitation fields of many urban and industrial centres in one agglomeration, positive for all centres, the governments are trying to eliminate the conflicts of interests with respect to institutional and infrastructural capital. The harmonization of interests of the centres with concatenated fields of economic gravitation leads in a longer period of time to full diffusion of economic gravitation fields<sup>11</sup>. As a result of diffusion of economic gravitation fields, regional integrated agglomerations are formed relatively quickly. But such strong integrated agglomerations also start to play the role of economic black holes in relation to other areas of the region or country.

Monitoring of the processes of concatenation and diffusion of economic gravitation fields in all regions and transborder areas is an important research task for all countries. The results of these studies would be useful in taking the decisions adapting the distribution of institutional capital (e.g. localization of

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<sup>10</sup> An example from Poland: the processes of disintegration of social capital under the influence of immigration stimulated by concatenation of economic gravitation fields of various urban centres in Poland is Warsaw and voivodship cities, especially in voivodships where political authorities have been located in several cities (e.g. Bydgoszcz-Toruń, Zielona Góra-Gorzów Wielkopolski). Specific processes of changes in social capital under the influence of overlapping fields of economic gravitation can be observed between Wrocław and Opole. The construction of motorways around Wrocław resulted in concatenation of the economic gravitation fields of Opole and Wrocław and thanks to a significant shortening of travel time it strengthened the use of Opole from the human and social capital of Opole by Wrocław (undertaking by Opole inhabitants with particularly high qualifications of work or other types of activity in Wrocław, due to the lack of development opportunities in the place of residence).

<sup>11</sup> In Poland the examples of such advanced diffusions of fields of economic gravitation are Upper Silesia or Tri-City agglomeration with the towns located on the Gulf of Gdansk of Baltic Sea.

regional governments and other institutions) and the optimization of administrative division of the territory of the country and the construction of nationwide infrastructural systems (transport, energy, water economy, local labor markets etc.).

The fields of economic gravitation of a cities, urban or industrialised areas are concatenated in many domains. Various areas of political, social or economic activity concentrated in urban centres, especially in metropolitan areas and agglomerations, create their own fields of economic gravitation. Their scope, strength and character of impact on the external and internal environment and on other areas of social and economic life depend on the specificity of particular domains of economic and social life. The factors determining the gravitational fields of particular fields are different.

As examples, let us consider the following domain, which create their "own" fields of economic gravitation:

*Labour market.* The field of gravitation of the local labour market of a city or agglomeration covers the places of residence of employees and the places of their work located within the territory of a given city or agglomeration. Most often the gravitational field of local labour market covers the area of commuting, daily and cyclical, seasonal, temporary or incidentally.

The field of gravitation of local labour market model is a set of several detailed models, e.g.:

- (a) model of gravitation field of daily commuting to work,
- (b) model of gravitation field of cyclical commuting (weekly commuting, commuting to work on specific days of the week or month),
- (c) model of gravitation fields of seasonal labour markets,
- (d) model of gravitation fields of periodic labour markets (e.g. labour market created by investments in agglomerations).

The size of gravitational fields of particular labour markets is determined primarily by transport infrastructure, time and conditions of commuting to work, the share of commuting costs paid by employees from their incomes, costs of living near the workplace in the case of cyclical and seasonal labour markets and the possibility of finding work on the terms acceptable by employee in his or her place of residence outside the agglomeration.

In the case of daily commuting to work, the construction of a highway or express road, faster suburban railway, improved commuting comfort and lower commuting costs paid by the employee cause a significant increase in economic gravitation fields<sup>12</sup>.

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<sup>12</sup> The examples from Poland. After the express road from Warsaw to Cracow was handed over, regional agglomeration of Radom, located about 90 km from the centre of Warsaw, became the

In the case of seasonal or periodical work, the fields of gravitation of the labour markets may include remote areas, also beyond the borders of the country. In mega- agglomerations we observe an active impact on the gravitation fields of the labour market, either in extending them in specific directions or in limiting them (e.g. Moscow, Astana, special economic zones in China).

*Culture.* Institutions organising systematically cultural events in urban centres create extensive fields of economic gravitation. Theatres, opera houses, concerts, museums and entertainment events are visited by people coming often from distant places. The modelling of economic gravitation fields in the domain of culture provides better knowledge on the direct participation of people in cultural events.

Cultural institutions and companies organizing mass cultural events have an active influence on the fields of economic gravitation. Electronic mass media, television and Internet broadcasts of cultural events have a strong influence on the scope and intensity of the processes taking place in the fields of economic gravitation in the field of culture.

*Health care.* Many health care facilities are concentrated in urban centres, especially those providing highly specialised services. Concentration of these centres and their medical staff takes place at the expense of towns located outside the city centres. The people that need health services must come to the centres from their places of inhabitation.

The cities in which are located medical universities and other schools educating medical staff and health care facilities (hospitals, clinics) associated with these universities generate strong and spatially extensive fields of economic gravitation for health care. From economic point of view it is more efficient to locate in these cities also other health care facilities instead of creating a network of scattered health care facilities closer to the patients in small towns and villages.

As a result of the accumulation of human resources and health care facilities in large cities, the functions of health care facilities in small towns are reduced to basic diagnostics and elementary medical services. All other medical cases are sometimes directed to remote specialized hospitals and clinics. The commercialisation of health care accelerates the strengthening of the gravitation

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area affected by the economic gravitation field of the local labour market in a large maul near Warsaw. The unemployment in Radom significantly went down because the inhabitants started to commute to work in this maul. Important research topic is the simulation of the expected influence of the highway Via Baltica-Via Carpatia (Helsinki – Thessaloniki) on the transborder economy integrating the towns and cities located along the borderline of Poland, Lithuania, Belarus and Ukraine.

fields in the domain of health care. In EU the transborder gravitation fields in the domain of health care is covering border regions in many countries.

The study of economic gravitation fields in the domain of health care created by large cities and agglomerations should be used to develop the health care infrastructure that would be optimal from the point of view of the society. In particular, it is important that the city dominating in the region, should not become the *black hole* in health care for other towns and villages of the region.

*Higher education.* The functions of education of human resources at the higher level for the governments, social organizations and businesses are performed by universities conducting scientific research, whose participants additionally educate students, and specialist vocational schools at the post-secondary level (so-called higher vocational schools), are located almost exclusively in larger urban centres. Almost all research institutes are also based in these urban centres or in the agglomerations. As a result, research and teaching staff are concentrated in the largest cities and agglomerations. The teaching and research staff consists of the most gifted university graduates, who are offered to make scientific career after graduation in these universities, in research institutes or in the research units of the government administration and big businesses.

The growing potential of scientific staff and much greater job opportunities in research institutes, better opportunities for scientific career and didactic work in higher education attract valuable human capital from the regional environment, and often from distant regions of the country<sup>13</sup>.

Strengthening the economic gravitation of large cities by law means the gradual decline in research and high quality education in smaller cities and towns. An additional negative effect of this process is the deprivation of smaller towns of valuable human capital, such as scientists and teaching staff of local universities.

*State governments and public administration.* In most countries of the world, the governments and public administrations of states and international organisations are located in large urban centres. This also applies to regional

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<sup>13</sup> Example. Legal regulations governing the functioning and financing of science and higher education (e.g. in Poland, the Act of 28 July 2018 entering into force on 1 October 2018). The Law on Higher Education and Science (Journal of Laws No. 2018, item 1668) not only strengthens the economic gravitation fields of large urban centres in the field of science and higher education, but also limits the development of scientific research and elite universities beyond them. The simulation of the effects of the regulations contained in this Act leads to the conclusions that the universities still existing in smaller towns will be reduced to the level of higher vocational or post-secondary schools. Research centres established in Poland after 1990 outside large urban centres have a chance to exist only if they are incorporated by universities from a nearby large city.

authorities and administrations. These centres are unable to generate from their demographic resources sufficient quantity and quality of human and social capital necessary to fill all positions in the state apparatus and in international organisations. Human capital is raised from other towns, especially from the surrounding region. Universities located in large cities are an important source of human capital for the governments and administration concentrated in large cities. In the case of posts requiring specific skills, especially in politics and management, the staff from other regions or even from other countries are invited, not always with good results for the country or region.

The governments and public administrations create strong fields of economic gravitation, narrow but with large geographical range. The strength and scope of these fields of gravitation depends on the gap between the cities' own human capital, and respective human capital available in the region.

In geographically small countries or countries with a small population, the gravitational field generated by state authorities is so strong that it leads to concentration of all mobile resources important for the state and economy in capitals of countries (e.g. in Europe - Estonia, Latvia, Finland). This phenomenon can be observed in small countries on all continents.

The shaping of economic gravitation fields by means of locating state bodies in specific towns of the region, outside the main existing settlement centres, is a strong tool of the state's regional policy. In conditions of good transport infrastructure and universal telecommunications, it does not matter whether any office is located 400 metres or 400 kilometres from the building of the central government.

Scientific analysis of the fields of economic gravitation fields generated by governments and public administration should be the basis for optimizing the location of governments and offices in specific places, so that the spatial distribution of these bodies fosters sustainable regional development and optimal use of all the country's resources. The objective of sustainable policy is to minimize the deprivation of smaller towns and cities their own human and social capital.

*Tourism and recreation.* Large urban centres and agglomerations need the access to the resources that provide their inhabitants with living conditions adequate to the level of civilizational and economic development. Therefore, in many agglomerations, the sustainable development policy pursued by state authorities and regional self-governments includes the separation of recreational and leisure areas within or outside their territory.

In the light of the *theory of economic gravitation*, we can conclude that the bigger is the city, the bigger is the agglomeration, the stronger is the

gravitational field of the access to the recreation facilities of its inhabitants. The effect of gravitation field in tourism and recreation is twofold:

- (1) The city with the increase in the number of inhabitants, including those "sucked" from the whole region, creates an increasingly larger agglomeration, including areas for recreation and recreation of its inhabitants. This incorporation takes place through the construction of transport infrastructure connecting the central regions of the city with its recreational and leisure facilities. The areas of this background quickly become economically dependent on the demand for recreational and leisure services. In the case of seasonal services, such dependence may have a negative impact on the use of resources (e.g. centres open 3 months a year, high amplitude of seasonal unemployment, etc.).
- (2) The increase of standard of life and incomes of the agglomeration's inhabitants generates demand for qualified recreation and leisure services. Such services may be rather often offered in regions with a relatively long distance from agglomerations. The criterion of availability is the time of access and its costs. Urban agglomerations can influence actively the scope of economic gravitational field for recreation and leisure, by building the infrastructure that is facilitating the access of inhabitants to the resources needed for recreation and other relevant services.

It seems that the models of potential economic gravitation fields in the domains of tourist, leisure and recreational services would be useful for for all regions and transborder areas that have natural or artificially built tourist and recreation facilities<sup>14</sup>. The models of existing economic gravitation fields and simulation models of economic gravitation fields shaped under the influence of planned infrastructure investments and changes in the standard of living and preferences of agglomeration's inhabitants with regard to recreation and recreation are an important tool of sustainable regional development policy.

The models of spatial delimitation and directions of influence of economic gravitation fields on people, national economy entities and on the transfer of resources are important for all transborder economies because of the complementarity of tourist and recreation resources of neighboring countries. The concatenation of the fields of economic gravitation created by and for different domains of social and economic life makes up the complex economic

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<sup>14</sup> Polish-Russian example. The region of Warmia and Mazury by the completion of the construction of genuinely fast traffic roads connecting this region with the agglomerations of Warsaw and the Tri-City, should help to determine optimal conditions for the sustainable development of this region. From this point of view, the cross-border cooperation policy of the region with the Kaliningrad region should also be analysed.

gravitational fields of agglomerations and surrounding environment, including transborder areas.

Optimization of the policy of regional and transborder development is taking into account the shaping of the fields of economic gravitation to minimize unnecessary relocating of the resources and all kinds of capital.

## **8. Specificity of transborder economic gravitation**

In open market-driven economy and the formation of ever larger agglomerations, including mega agglomerations, the fields of economic gravitation created by them extend beyond the political borders of the states.

The phenomenon of the fields of transborder economic gravitation is particularly evident in Europe, where the geographical area of many countries is small and the political boundaries established after World War II divide areas which in the past constituted a single economic regions. The fields of transborder gravitation are also important in the economies of Central Asia, Central America and for all micro, mini and small economies.

Here are the examples of transborder economic gravitation in Poland. The examples of concatenated transborder fields of economic gravitation can be observed along the borderline of Poland with Belarus and Ukraine. The cities located on the eastern border of Poland (Białystok, Lublin, Rzeszów), on the territory of Belarus (Grodno, Brest) and Ukraine (Lvov) are generating their own fields of economic gravitation that are overlapped in some domains – trade, services, labour market. When the border between Poland, Belarus and Ukraine is fully opened for businesses and institutions for transborder cooperation with Poland, one shall expect rapid development of integrated transborder economies.

It is recommended to realize research projects and build the set of simulation models of transborder processes and concatenation of economic gravitation fields of Grodno and Białystok, Brest and Lublin, Lvov, Przemyśl and Rzeszów. Additionally, the researches could take into account the influence of the realized new transport infrastructure of Via Baltica and Via Carpatia, potential effects of their impact and the need of accompanying investment projects, which should be included in the regional development programs of local governments of Poland, Belarus and Ukraine.

Interesting research problem is the analysis of the impact of transborder field of economic gravitational of the Berlin agglomeration on the areas located on the western border of Poland would be important for the development policy of the Lubuskie Voivodeship.

Important scientific problem seems to be the simulation of the concatenation of the economic gravitation field of the St. Petersburg agglomeration on the gravitation fields of Helsinki, Tallinn, Narwa and Dorpat, when the economic borderlines around the Finnish Gulf will be fully open. This model could be used as the case study for simulation of similar transborder processes in other parts of the world.

For example, it would be interesting to study the formation of a trans-boundary economic gravitation field generated by the mega-agglomeration of Istanbul. Such a cross-border multi-centre economic gravitation field exists in the regions of Vienna, Bratislava, Sopron and Gyor. In Europe, we can point to many places where regional development is shaped by the influence of cross-border economic gravitation fields generated by cities and agglomerations and their cross-border diffusion. It is worth identifying similar situations in other regions of the world and initiating research based on the experience gained in the Tri-City area in Poland and neighbouring Kaliningrad oblast of the RF.

## **9. Information gaps and needs for monitoring of transborder economic gravitation**

So far, there has been no systematic study of transborder economic gravitation, economic gravitation fields and their impact on social and economic processes at regional level. The lack of such research was probably the reason why the phenomenon of economic gravitation and its impact on the polarisation of development in the regions was not taken into account when programming and planning regional development. The decision-makers were not systematically provided with information allowing for a comprehensive assessment of the impact of economic gravitation of cities on the effectiveness of investments which were intended to serve the development of small towns and cities but which, as a result, contributed to the deepening of their economic and social cohesion.

Special attention should be paid by the researchers to the changes of transborder economic gravitation as the effect of technological progress in transport, telecommunication, technical infrastructure and the effect of political and institutional interventionism in globalized economy. For example, by launching the long-awaited expressway or small town bypass, transit traffic disappeared from the streets of the city, but at the same time a number of small service companies serving this traffic were liquidated and the authorities did not ensure in good time that they could move to the vicinity of the nearby bypass or motorway or create other alternative business opportunities for local businesses.

The main reason for gaps in the study of economic gravitation is the lack of statistical data and other systematic factual information on transborder processes and phenomena. Monitoring of economic gravitation processes should become an integral part of official statistical research. The main aim is to complement the spatial and temporal identification in statistical surveys of all statistical domains that describe the state and regional development at the lowest possible level of detail, i.e. the smallest settling or territorial units of units in which industrial activity is conducted (towns or their parts that are separable).

The monitoring of transborder economic gravitation should include statistical observation of immobile resources useful for social and economic entities of the region and processes of moving mobile resources between localities with sufficient detail and frequency to build dynamic models of moving different types of resources between localities and technological and cooperative links.

Cooperation of official statistical agencies of countries interested in the monitoring of transborder economies, the harmonization of programs of surveys, joint surveys of transborder processes, the interchange of data between statistical offices on regional and central level and maintenance of transborder parainformation (directories) system are the prerequisites of building solid common information platforms for monitoring and analyses of transborder economic gravitation and its role in modern, open knowledge-based economy.

## **10. Conclusions**

1. Economic gravitation generated by cities and other areas of concentration of the resources is important for sustainable development of regions and transborder economies.
2. In open market-driven economy the transborder economic gravitation plays an important role in the development of border regions.
3. The processes of economic gravitation in market-driven economy domination lead to the deepening of disproportions in regions and transborder areas.
4. Concentration of institutional and social capital in cities is strengthening the power and scope of the fields of economic gravitation which "suck" the resources of less developed areas and limit their development possibilities. In open economic borderlines, in transborder economies the cross-border impact is often stronger than on the territory of one country.

5. In the conditions of the concentration of resources in one or several urban centres, under the influence of economic gravitation fields, it appears the syndrome of *economic black hole*. The effect of this syndrome is the deep disproportions in the regions and petrified peripheralisation of towns and other settlements located outside the centres of economic gravitation, also on the whole territories of transborder economies.
6. The policy of localization of institutional capital and support by the governments for the organizations creating human and social capital are effective instruments of sustainable transborder development.
7. Infrastructural investments of national, regional and transborder range influence the economic gravitation fields generated by urban centres and industrialised areas, their spatial scope, strength and directions of the migration and transfer of the resources and the formation of agglomerations as economic black holes. When deciding on these investments, it is necessary to take into account their impact on the changes in economic gravitation and their effects on the sustainable development of regions and transborder economies.
8. Monitoring the processes of regional and transborder economic gravitation, analysis of its impact on the formation of developmental disproportions and informational supporting the results of these studies by governments at the national and transborder level is the duty of official statistics and other institutions managing official information systems and a challenge for scientists dealing with the problems of transborder economics.

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