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**LOGISTICS OF ECOLOGICAL CITIES
(ECO-CITIES) AS INSTRUMENT TO BE
USED WHILE BUILDING
COMPETITIVENESS OF REGIONS ON
INTERNATIONAL MARKET**

Introduction

In the contemporary world competition has become a natural determinant of all social, economic, or political phenomena. Business entities that offer more than their competition are bound to win. Therefore, good preparation for a competitive struggle is a prerequisite for success. People, social groups, political parties, and nations compete. Entities that compete may include a single company, a group of companies (that are configured in a different way depending on objectives set by a particular group), sectors, and economies. What is more, regions, states, and continents compete as well¹. With reference to regions (that are subject to considerations in this paper) competitiveness manifests some position (the economic one in a majority of cases) of one region in relation with others. The position is established by comparing quality of actions undertaken to their results by means of categories of superiority and inferiority². Competitiveness of regions may also be understood as their ability to accommodate themselves to changing conditions of functioning and to succeeding in business competition. Moreover, competitiveness is a process as a result of which a region gains its competitive advantage³. Hence, it is possible to assume that competitiveness means some ability to realise objectives on the market of regional competition effectively⁴. Region's objectives will generally be realised by winning battles against other regions.

1. Instruments to be used by regions while competing with one another

Competition related instruments are some kind of 'competitive weapons' that are used by businesses to find customers who would buy their offers. Region competitiveness should be considered in the following relationships: regional potential, capacities, and skills of regional authorities versus market struc-

¹ A trivial although deeply true statement that 'globalisation makes everybody compete with everybody' may be now made. In particular, a region competes with other regions of the world in order to gain some competitive advantage. In the above context the article presents considerations that concern inter-regional, international, and even global scales.

² J. Reiljan, M. Hinrikus, A. Ivanov: *Key Issues in Defining and Analysing the Competitiveness of a Country*. University of Tartu, Tartu 2000.

³ [Http://www.agro-info.org.pl](http://www.agro-info.org.pl) (26.08.2008).

⁴ M.J. Stankiewicz: *Konkurencyjność przedsiębiorstwa. Budowanie konkurencyjności przedsiębiorstwa w warunkach globalizacji*. Uniwersytet Mikołaja Kopernika, Toruń 2005, p. 36.

ture along with market strategic opportunities. The above approach allows for distinguishing basic and key competitiveness of any region. Basic competitiveness involves processes and systems that make it possible to provide region's recipients with more location related benefits. Key competitiveness concerns managerial skills of regional authorities since the skills in question lay the foundations for long-lasting competitive benefits on a particular market⁵.

Competitiveness of any region is manifested in its attractiveness that allows for:

- competing with other regions,
- reaching a desired level of development,
- reaching a high level of income and employment, and
- ensuring attractive life and business conditions⁶.

Competitiveness of regions may also be deemed to be investment attractiveness and some ability to reproduce capital extensively, to generate innovations, to co-operate with foreign partners, and to export effectively. Additionally, competitiveness may also involve a position in regional rankings⁷. A. Klasik defines competitiveness of a region to be some advantage over other regions and the advantage is a resultant of the following factors:

- attractiveness of a service offer aimed at present and potential users of a region including inhabitants, companies, investors, visitors, etc.; the attractiveness in question stems from modern tangible, institutional, and intellectual infrastructure of any region,
- assets, i.e. the most important strengths of a region; the strengths in question are to be found, inter alia, in education systems, economic structures, and infrastructure⁸.

With reference to attractiveness of any service related offer, decision makers are given a wide spectrum of possibilities to stimulate the attractiveness in question by means of their regions, thus trying to create their own instruments to be used while competing. A region, to some extent, should build its competitive advantage using logistics related tools – increasing this way its attractiveness

⁵ D. Faulkner, C. Bowman: *Strategie konkurencji*. Gebethner i S-ka, Warszawa 1996, p. 44.

⁶ E. Zeman-Miszewska: *Kreowanie konkurencyjności regionów przez samorządy terytorialne*. In: *Marketing terytorialny. Możliwości aplikacji, kierunki rozwoju*. Eds. H. Szulce, M. Florek. Poznań 2005.

⁷ Z. Mikołajewicz: *Czynniki konkurencyjności rozwoju regionów*. In: *Konkurencyjność miast i regionów Polski południowo-zachodniej*. Ed. R. Broszkiewicz. Wrocław 1999, p. 42.

⁸ A. Klasik: *Konkurencyjność województwa śląskiego na tle innych regionów. Ujęcie syntetyczne*. In: *Województwo śląskie. Integracja, konkurencyjność, nowe inicjatywy*. II Śląskie Forum Rozwoju Lokalnego i Regionalnego. Akademia Ekonomiczna and Górnośląska Wyższa Szkoła Przedsiębiorczości, Katowice 2001, pp. 99-100.

due to provision of exceptional logistics assets⁹. Building of such assets is also accomplished (although not exclusively) by means of creating and highlighting exceptionality and specifics of a particular location. The assets mentioned above are effectively obtained in cities in particular, i.e. in places that are highly marked out to create new intellectual and tangible assets. Hence, it is necessary to look for competition related instruments among the factors (or activities) mentioned above.

2. City versus region – interdependencies that are not always explicitly beneficial

In the contemporary world innovations make up a core of modern economic growth strategies along with, development of companies, and generation of nations' wealth. Effective competition of regions is therefore more and more connected with regional innovativeness. Innovativeness depends on quality of *interdependencies between entities that generate knowledge and innovations* in any economy and *a particular region*. Hence, an innovative system translates into institutions and interdependencies between the institutions in question, as a result of which a particular economy becomes an efficient mechanism of knowledge distribution aimed at further knowledge processing. Such institutions along with conditions that facilitate their development are usually to be found in large cities. Due to their specifics, cities are indeed launch pads of innovativeness. Specifics of a city understood as a location is not only connected with any actual and tangible space, but also with a virtual and discursive context of a particular location. The specifics in question is related to local, cultural, religious, and national co-existence, and involves some desire to build some own unique city. Mythologizing of a location frequently takes place as well¹⁰. Such conditions – only – will help a city attract different users whose quantity makes up a perfect 'explosive mixture' that is able to create qualitatively new values. The values offer foundations for obtaining and diversifying competitive advantage¹¹. In his-

⁹ For more cf. J. Szoltysek: *Ocena przygotowania regionu do absorpcji rozwiązań logistycznych*. "Gospodarka Materiałowa i Logistyka" 2008, No. 4, pp. 2-8.

¹⁰ The author took up issues related to some influence of mythologizing location on selection and sequence of actions to be undertaken within urban logistics more extensively in a few articles including, inter alia, the following: *Wpływ percepcji przestrzeni miejskiej na organizację działań logistyki miasta*. Akademia Ekonomiczna, Poznań 2008.

¹¹ M. Bassand: *Metropolisation et inegalites sociales*. Presses polytechniques et universitaires romandes, Lausanne 1997.

tory, cities functioned due to their immediate and more remote surroundings that were simultaneously providing necessities and receiving municipal services. According to contemporary theories that set directions and tempo of urbanisation, a process of transforming larger cities into the so-called megacities (megapolises¹²) is soon to be witnessed. The process involves intensive development of single dominating cities whose number of inhabitants exceeds populations of neighbouring cities several times. In a majority of cases such a phenomenon is detrimental and that is why numerous countries undertake some attempts (unfortunately without much success) to overcome potential threats. Development of large agglomerations will be hampered as a result of insufficient locations to be urbanised. Therefore, future cities will grow upwards building higher and higher sky-scrapers. They also grow downwards – deep into the Earth¹³. This part of considerations is entitled ‘city versus region – interdependencies that are not always explicitly beneficial’ since it is worth answering briefly the following questions: What is the influence of the metropolisation process on regional surroundings (base) of large cities? Will positive spread effects predominate, thus contributing to some increase in competitiveness of a region or will regions get degenerated through backwashing their developmental resources? And consequently – will the above lead to equalising differences in the levels of development between a city and its region or will polarisation of development have to be dealt with?

In conditions of globalisation agglomerations absorb resources from their base in order to find new markets where they can compete selling their products or rendering their services. Such markets become sources that provide goods and services of unique nature, i.e. the one that cannot be provided by the very base. Agglomerations are interested in having its own strong base and that is why they undertake actions that are aimed at increasing their regional potential. Regions are interested in developing agglomerations because their wealth depends on wealth of agglomerations. Although anticipations concerning adjustment of multifunctional urban agglomerations to free market economy may seem to be right, they fail in case of the role of large cities and agglomerations in inducing any development in a wider special scale.

In case of megacities, the most immediate geographical environment is necessary only to perform housing and some other scarce economic functions.

¹² Whose number of inhabitants exceeds ten million.

¹³ Which poses many new challenges and tasks for logistics as well. Such futuristic cities are discussed in novels (e.g. ‘Vertical’ by Rafał Kosik, Powergraf, Warszawa 2006). A wide range of research aimed at dealing with potential threats related to underwater cities or pyramid cities growing hundreds of metres up or is carried out as well.

Megacities' functioning results in intensive economic impoverishing of their own direct territorial base (i.e. backwashing developmental resources) along with processing acquired resources to succeed in relationships with other megacities. It is possible to assume that development of megacities is carried out at the cost of their direct territorial base. In principle, it is possible to compare functioning of megacities to mechanisms of malignant tumour cells that perform their rapid and uncontrolled development by means of destroying all surrounding cells through dysplasia and anaplasia. Such interdependencies are presented in Figure 1. Hence, is it in the interest of any region to create conditions that would favour emergence and existence of a megacity in the very region's territory? Is it possible to stop processes of transforming agglomerations into megacities? Is it possible and necessary to look for alternative solutions within co-creating development of cities in any territory? It seems that regions ought to try to answer the above questions.

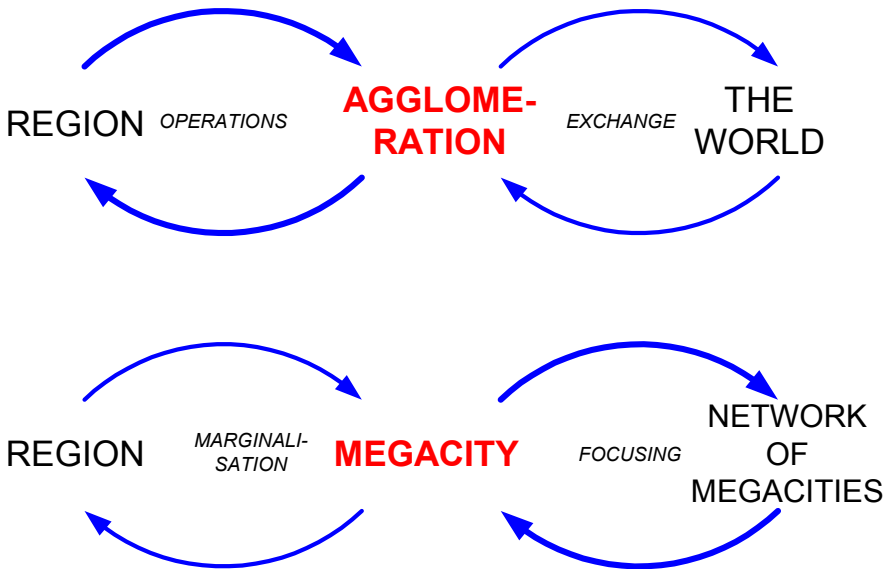


Figure 1. Influence exerted by agglomerations and megacities on regions

Source: M. Smętowski: *Nowe relacje między metropolią i regionem w gospodarce informacyjnej*. "Studia Regionalne i Lokalne" 2001, No. 4(7).

3. Ecological cities (eco-cities) – an alternative instrument to be used by regions while competing

Taking the above into consideration, one may say that a city is an element of a region that requires more attention in the aspect of region competitiveness. A process of creating cities is a process of urbanisation. The very process has its start, but it seems not to have any finish, which does not refer to any particular city, but is connected with a process to be witnessed worldwide (when a city loses objectives of its existence, it collapses, thus terminating processes of singular urbanisation¹⁴). Urbanisation is a process that exists objectively – it may be identified by means of observation of a growing number of city inhabitants or some increase in a quantity of cities. The indicated above regularity of transforming selected cities into agglomerations (and then potentially into megacities) suggests inevitable emergence – at some stage of region development – of problems that affect the very foundations of regional existence. Is it however the only pre-defined scenario of development? As it turns out, future may be considered alternatively with reference to the concept of the world of megacities. Alvin Toffler in his book entitled ‘The Third Wave’ notices that the post-industrial civilisation disperses population rather than focusing it, thus changing human experience concerning space. He also presents some point of view according to which in well-developed countries a phenomenon of creating large cities (including megacities) started to diminish in importance as early as in the 80s. Tokyo, London, Zurich, Glasgow, and numerous other large cities started to lose their inhabitants who moved to middle-sized cities or small towns¹⁵. What is more, Toffler – as a visionary – highlights vast changes in human perception of nature, evolution, progress, time, and space¹⁶ that took place when the third wave arrived. Therefore, I am deeply convinced that we are slowly, but inevitably approaching such principles of functioning that are – in the conditions of the post-industrial era – based on a total perception of all emerging phenomena and mutual feedbacks along with other Toffler’s indications. The above trend of thinking requires much attention paid to appreciation of the sustainable development that is sometimes referred to as ‘eco-development’. S. Kozłowski suggests a definition of eco-development that, in my opinion, is quite accurate from a per-

¹⁴ The very process is usually terminated as a single case because each of the urbanisation aspects has to finish one day – demographically: a city loses its inhabitants, spatially: a city gets smaller and its substance gets degenerated, and socio-economically: inhabitants leave their city.

¹⁵ A. Toffler: *Trzecia fala*. PIW, Warszawa 1997, p. 453.

¹⁶ *Ibid.*, p. 456.

spective of my considerations. According to the definition, eco-development involves all activities that are undertaken to improve conditions of human life on earth and that do not result in degeneration of the natural environment¹⁷. In such conditions, rules that govern running business activities are relatively well established and the relevant knowledge is widely popularised. Only lack of good will may lead to a situation when a particular country or region develops with no regard for principles of sustainable development. A different situation is to be dealt with in case of cities and their functioning. Contemporary cities cannot be called ecological cities since they are subject to numerous undesirable ecologically phenomena. The phenomena in question include, inter alia, the following problems:

- ecological elements of urban ecosystem structures are not only developed, but they also undergo widespread destruction,
- there is no proportional growth of biomass and increase in diversity of green areas in cities or in neighbouring forests in relation to enlarging urbanised areas,
- greenery and open spaces in cities occupy small and quite dispersed areas that do not form any internally linked systems,
- air and waters are intensively polluted by industrial plants, vehicles, and central heating systems of housing estates and detached houses,
- too much energy that comes from non-renewable sources is used,
- plots that are aimed at new investments, roads and parking spaces are frequently used irrationally at the cost of green spaces,
- there is some decrease in the quality of soil as a result of erosion and due to usage of artificial fertilisers,
- insufficient attention is paid to economical consumption and storage of water in cities; and what is more, water is chronically being polluted, and
- degeneration of the nature in cities and their outskirts results in extinction of numerous species of animals¹⁸.

Knowing such irregularities, it is possible to suggest a concept of ecological cities. Such cities appear on the other pole of urbanisation development and may offer some alternative to creation of megacities. Guidelines to be employed while creating ecological cities are presented by Richard Register – an American builder, architect, and veteran who has been fighting urban expansion for more than thirty years to make cities function in compliance with the laws of nature. His concept of an ecological city provides for, inter alia, utilisation of solar en-

¹⁷ K. Górka, B. Poskrobko, W. Radecki: *Ochrona środowiska – problemy społeczne, ekonomiczne i prawne*. PWE, Warszawa 1995, p. 79.

¹⁸ W. Pęski: *Zarządzanie zrównoważonym rozwojem miast*. Arkady, Warszawa 1999, p. 32.

ergy supported by meticulous recycling. Such solutions will have a positive impact on each city and its surroundings. His other principles include minimising consumption and maximising environmental protection. Richard Register believes that considerable reconstruction of cities will make them environmentally-friendly and provide their inhabitants with appropriate living standards. In order to realise the above concept, an ecological city must firstly dispose of cars. However, is it possible to imagine a contemporary city without cars? It would probably be quite complicated for citizens of the European Union or United States to do without their vehicles although according to statistical data only every thirteenth person in the world owns a car, which means that just 8% of our population is responsible for air degeneration resulting from car engine exhausts. For that reason, existence of cities without cars seems to be possible. The author of the ecological city concept is convinced that automotive concerns should aim at developing efficient and ecological mass transportation systems. The concerns also have to create new systems of renewable energy and their work must be supported financially by state budgets so – inter alia – cities could get greener and healthier. In order to reach the goal mentioned above, it is necessary to rebuild cities from scratch¹⁹. The concept that provides for creating a city without cars appears to be a little futuristic and unreal although it is methodologically feasible. Such a solution is inevitably connected with numerous changes that are required in human life styles. For instance, it might be necessary to change location of employment to find a new job that would be closer to a place of residence or vice versa: to change a place of residence to be closer to a new employer. In an ecological city some other forms of transportation may be used, e.g. a bicycle that does not pollute air and that allows for travelling a longer distance than in case of walking. Unfortunately, people feel addicted to cars, which does not allow for easy and rapid launch of the ecological city concept. In order to change such a situation, it is necessary to alter the way people think about their world and approach all ecology related issues. Nevertheless, such problems may be solved, which is confirmed by several examples of cities without cars including Venice in Italy or Gulongyu in China²⁰. Elimination of cars allows for increasing quality levels of living standards in a city – not only by means of some decrease in congestion, but also through less exhaust and noise. At present, permissible noise levels in urbanised areas are defined by the European Parliament Directive²¹.

¹⁹ [Http://commongroundmag.com/2005/06/greencities0506.html](http://commongroundmag.com/2005/06/greencities0506.html) (26.04.2007).

²⁰ [Http://www.postcarbon.org/blog/570](http://www.postcarbon.org/blog/570) (30.04.2007).

²¹ The European Union Directive No. 2002/49/WE.

In order to estimate acoustic conditions of a particular area some acoustic maps are made. Such estimations are made for areas situated in the immediate vicinity of roads to be used by more than six million vehicles annually and railroads to be used by more than sixty thousand trains annually²². The above guidelines help us understand the scale of the problem resulting from excessive noise produced by transportation traffic in contemporary cities. The very problem does not exist in the concept of any ecological city. Elimination of cars liquidates a phenomenon of transportation related congestion, which positively influences life quality standards perceived by city inhabitants. Simultaneously, some decrease in carbon dioxide emission is obtained, there is less damage resulting from vibrations and social tensions that stem from the universal problem of growing congestion are soothed. Additionally, elimination of car related traffic in cities provides new areas to be alternatively used (i.e. more green spaces, creating new bicycle routes, etc.). Moreover, such a solution decreases density of current road infrastructure in cities. In order to make sure that travelling in cities is not going to be difficult, a city has to consist of the so-called fractals, i.e. similar parts that let all inhabitants satisfy their all needs. In other words, fractals are compact and condensed clusters of inhabitants who are locally provided with employment opportunities, schools, nurseries, entertainment, etc. Such a solution will make cities safer and all mobility-related needs are going to be satisfied by walking, cycling, or using public transportation. The city in question is not divided into its centre and suburbs. All facilities must be located close enough so all inhabitants could reach their destinations using their muscles only. However, particular fractals that make up the whole ecological city ought to be linked by means of rapid and environmentally friendly public transportation, which will reduce urban pollution and noise²³.

There are some critics of this concept who believe that it is not possible to employ all inhabitants in the area of their ecological city so everybody could find employment close to their place of residence, which may seem particularly true since there are no plans to build production plants and other place of mass employment in ecological cities. Nevertheless, authors of the concept persuade their opponents that each inhabitant will find alternative employment²⁴. The ecological city concept created by Register is in opposition to functioning and developing related mechanisms of contemporary cities whose areas are still growing (being at the same time somehow limited by slums that are usually located in the outskirts). Therefore, according to the concept in question ecological cities

²² *Monitoring halasu*. "Ekopartner" 2007, No. 1(183).

²³ P. Kossobudzki, P. Stanisławski: *Miasta jak bestie*. "Przekrój" 2006, No. 26.

²⁴ For more *ibid.* and cf. <http://www.raisethehammer.org/index.asp?id=142> (30.04.2007).

will grow upwards in order to avoid occupying large areas, thus enabling city inhabitants to gain a free access to all city corners without using cars²⁵. A majority of buildings in a city will be characterised by their universal purpose, which sounds a little like some fantasy but – in fact – is feasible. The buildings in question will accommodate different forms of entertainment, restaurants, schools, and dwellings. Terraces and roofs will be covered with cultivated and decorative plants. Lower levels will house institutions that do not need much light although all buildings will be designed to provide lower levels with enough sunlight. Skyscrapers will be linked by means of special passages that will facilitate flows of pedestrians. Introducing much greenery into cities along with providing a sufficient number of fountains will allow for avoiding overheating problems. All the solutions mentioned above will provide their users with healthy living environment and perfect aesthetics of surrounding spaces²⁶. Concluding, such cities may become some alternative offer for regions and the very offer is not going to pose any threats that have to be dealt with in megacities. Ecological cities may create perfect environment for innovative communities of the Silicon Valley type. If ecological urbanisation of regions were acknowledged to be some idea for their future, it would be worth paying some attention to the role of urban logistics in realising the concept presented above.

4. Logistics of an ecological city

Urban logistics is a domain of knowledge that emerged in the 90. of the 20th century as a remedy for widespread problems stemming from transportation congestion. Urban logistics assumptions comply with assumptions of economic logistics. Urban logistics involves a set of processes of managing flows of people, cargo (freight), and information inside the logistics system of a city. Such management provides for environmental protection and recognises that a city is a social organisation whose major priority is to satisfy its users' needs²⁷. Discussing logistics of an ecological city, it is – in principle – possible to consider functions of urban logistics that refer to improving transportation of people and cargo, to creating integrated transportation chains, and to managing all flows that have been just mentioned. Since a city is supposed, however, to grow upwards and its structure is to take a fractal-like form, the most important task of logistics

²⁵ [Http://www.context.org/ICLIB/IC08/Register.htm](http://www.context.org/ICLIB/IC08/Register.htm) (30.04.2007).

²⁶ P. Kossobudzki, P. Stanisławski: Op. cit.

²⁷ J. Szoltysek: *Podstawy logistyki miejskiej*. Akademia Ekonomiczna, Katowice 2007, p. 52.

at the stage of designing transportation systems is to optimise layouts of major transportation routes – both horizontal (traditional linear infrastructure) and vertical ones. Hence, specialists of ecological city logistics ought to deal with the following issues:

- selection of appropriate ecological means of transportation that would be used to transport cargo in cities,
- decision where the flows in question should be located and whether own transportation should be involved or not,
- application of combined transportation, e.g. ecological electrical vehicles and muscle operated vehicles,
- optimisation of transportation (infrastructure, loading capacity of transportation means, and lower energy consumption),
- organisation of effective utilisation of transportation infrastructure or reduction of the space occupied by the infrastructure in question, and
- co-ordination of cargo flows with regard to principles that are put into practice in cities.

Co-ordinating flows of people should be maximally based on employing multi-modal systems that involve at least two branches of transportation used in urban areas. A good example may be provided by using a bicycle and ecological means of transportation (or an ecological city cab and a travelator) in one journey. Using such a system requires, however, provision of parking spaces for bicycles along with development of new transfer points (multi-modal connectors). It is also necessary to find optimal locations for the above facilities.

Cargo flows in each type of a city aim at satisfying city inhabitants' needs. Satisfying needs that are related to cargo flows in an ecological city is rather even because its inhabitants' needs are much more predictable. Additionally, transportation needs in use in an ecological city generate some even demand for not using their availability in order to reduce consumption of additional energy that could be necessary in case of higher intensity of flows in some time intervals. Moreover, an ecological city does not have any transits as a result of its fractal nature and vertical development (transits are frequently a source of numerous problems in contemporary cities). As a result of economising, producing a large part of resources locally, and effective recycling, volume of transported cargo, cargo types, and distances are much smaller than in case of traditional cities. In an ecological city flows take place within a city, to the city and from the city. Nevertheless, cargo flows within such a city is characterised by the highest frequency because all ecological cities aim at providing themselves with availability of the possibly highest amount of goods that are necessary in everyday life. This is possible due to utilisation of all available areas to grow cultivated

and decorative plants. Intra-municipal transportation conforms to ecological principles due to using muscle operated vehicles to transport cargo that is not usually too heavy or spacious. Larger and heavier cargo is transported by means of trains that are powered by electricity produced by solar cells. Such trains are used during a day only when the sun shines and therefore, it is possible to discuss evenness of their utilisation. This type of transportation is also used in case of transporting cargo from other places. It is necessary to highlight that cargo transported by such vehicles reaches a particular place in a particular fractal and then is delivered to its destination by ‘small’ carriers who use their muscle operated vehicles. Scarce waste that cannot be recycled is collected by the same trains on their journey back. Such trains, however, have to be sufficiently protected against contamination. Frequency of the trains in question with regards to inhabitants’ needs is not very high. Nevertheless, it is impossible not to assume that a city does not need any goods that are not produced locally. Due to the solution discussed, it is possible to provide retail outlets with goods that are indispensable in everyday life and that cannot be manufactured in the very city. All flows in an ecological city should be co-ordinated by a mobility co-ordination centre that has its executive units in each fractal. Such a complex approach results in elimination of sub-optimal mobility decisions, increase in effectiveness of transfers and better life comfort to be perceived by inhabitants. That is why, success of an ecological city in the aspect of transfers is being realised in the very city depends on effectiveness of logistics actions undertaken.

Conclusions

If future of any region depended on the region’s effective competition with other regions, it would be necessary to look for instruments that may be utilised while competing effectively. A plural form is deliberately used in case of instruments. Success is likely to be achieved when opportunities and threats are correctly diagnosed, when a scenario of development is selected and when objectives are reached as a result of a carefully chosen set of instruments. Region’s competitive advantage might be affected by cities to be found in a particular region. Cities – in a majority of cases – allow for development of innovations. Ecological cities, due to their diverse nature and specific climate – seem to provide perfect environment for innovation emergence. When any region decides to promote the idea of ecological cities, logistics of the cities in question will become an indispensable element of instrumentation to be employed while striving for competitive advantage.

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