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## Need for Linear Revitalization - Gdynia Case

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**Abstract.** The aim of the article is to discuss the need of defining and implementation of the *linear revitalization* - the new approach related to the revitalization processes. The results of the preliminary investigations indicate that this kind of revitalization seems to be an important tool supporting city management and planning, especially in cases of cities fragmentation - causing lack of physical, social, economic and ecological cohesion. The problems which may occur in such situations could be, in author's opinion, solved with the use of linear revitalization. Linear revitalization relates to various linear city structures, which need a renewal. The article presents the idea of new attitude, character of specific actions related to degraded linear structures, draft classification, as well as the potential benefits to the city structure which could be reached due to the linear revitalization implementation. The theoretical deliberations are supplemented by the description and assessment of the chosen case study from Gdynia in Poland. The Kwiatkowskiego Route in Gdynia, playing important role in the city traffic as the external connection, creates the barrier in the city structure, causing many negative effects. Author presents specific problems related to chosen example, and the ways to solve them and to connect city structure. The main conclusion of the study is that the presented approach may be, in author's opinion, the beginning of the discussion related to the linear revitalization, which may become an important and effective tool of sustainable city development. It may help overcoming physical barriers, and minimise functional, economic, social, mental and environmental conflicts caused by city fragmentation.

### 1. Introduction

There is a rich literature concerning the revitalization of different types of linear structures [1, 2, 3, 4, 5]. But linear revitalization, due to the author's knowledge, has not been defined yet in English or Polish literature<sup>1</sup>. This fact was the reason for the author to define new approach and present the idea of linear revitalization. The first part of the article gives a theoretical background of linear revitalization. The definition, specific character, goals and types of linear revitalization have been presented, as well as potential benefits to the city structure and society. In the second part the chosen example from Poland illustrates the need of linear revitalization. It supports the thesis that only the linear revitalization, as an integrated and continuous package of different activities, can bring to the fragmented city structure spatial, functional, visual and socio-economic benefits.

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<sup>1</sup> The only exception of the usage of the term „linear” revitalization was found in the short article describing Pittston city revitalization, focused on the first-floor businesses in Main Street [6]. But this term has not been described neither defined in any way.



## 2. The idea of linear revitalization

There are many barriers in contemporary cities, like transit roads, railways tracks, polluted rivers, embankments, walls, abandoned land strips, degraded waterfronts, which create many problems of different nature. For example, the conflicts arising from the road planning and construction have been arranged into four groups [7]:

- spatial and functional: city's fragmentation, functional disconnections, reduction of the density and compactness of cities, fragmented urban tissue, chaotic and uncoordinated development, bad functioning of neighbouring areas playing different role; a reduction of a quality of public space;
- environmental: destruction of natural values, pollution of soil, water and air, interruption of natural links, occupying valuable undeveloped areas of cities that are often the last areas of natural beauty and landscape, the growing congestion on roads, causing subsequent effects;
- visual and compositional: disconnection of compositional links, visual and functional chaos, transformation of an urban landscape into technical one. The New Charter of Athens, 2003 adds creating the barriers, fragmentation of urban structures, transformations of landscape and visual changes;
- social: human health risk, the lack of security, social problems, the lack of continuity of public spaces.

Such conflicts of different magnitude and scope may occur in the case of any barrier in the city. Therefore, there is a need to connect fragmented city spaces. But it is impossible to solve such a diversity of problems without systematic, interdisciplinary and complex approach. It seems that one of the tools may be linear revitalization - the specific type of general revitalization process.

Linear revitalization has been defined here as a system of socio-economic, physical, environmental, cultural and artistic activities undertaken in different types of linear city structures, aiming to renew and revitalize degraded larger surrounding areas, through creation of spatial, functional, natural, compositional, visual and mental connections of fragmented city parts.

These activities may include physical actions: infrastructure (modernizations, new technologies, green and blue infrastructure), public transport (new connections, better access), public spaces (attractiveness, access, safety), urban tissue (modernizations, new standards, necessary demolitions, new land use, cultural heritage protection, landscaping, lightening), natural systems (protection, repairing, new connections, new systems) and socio-economic actions: trade and services development, creation of new work places, introducing public works, creating new investing possibilities, enabling and enhancing entrepreneurship, encouraging new investors, activation public participation, implementation of educational programs, social help.

The main criterion which differs linear from general revitalization is the linear character of area under revitalization and the necessity of continuous physical and functional activities. It has not only technical, but also socio-economic and environmental character. Linear revitalization can be seen as a powerful catalyst of urban changes, which influences broader surrounding areas, although it refers in physical context mainly to narrow linear structures. But the results can be seen in larger city areas, along the whole length of the belts under renovation and around. Linear revitalization enables free flow of people, matter, energy and information. Revitalised belts may bring new values, repair the functioning and image of broader city districts. The effort concentration on chosen strips enables the better identification of barriers and related problems, adequate diagnosis and concentration of efforts and resources, what may more effectively influence broader city structures.

Linear revitalization should be based on complex and interdisciplinary approach, including as well technical and humanistic approach, due to diversity of problems being the results of barriers. The landscape architecture should underline the linear character of interventions. Linear revitalization needs

the implementation of many activities: the diagnosis of the existing state, the description of reasons of problems, the assessment and classification of conflicts, defining the aims of revitalization, including the city strategy, tools, financing resources, spatial scope of activities and the groups of inhabitants achieving advantages, as well and public participation process.

Linear revitalization may bring to the city many benefits of spatial, socio-economic, cultural, environmental, landscape and visual character, depending on the type of undertaken activities.

### 3. The types of linear revitalization

We may define three general spatial types of linear revitalization:

1. the actions aiming to cross existing barriers of linear character
2. the actions aiming to connect fragmented city structures using modernized or new linear connections
3. the actions of linear character aiming to connect the city with its surroundings (figure 1).

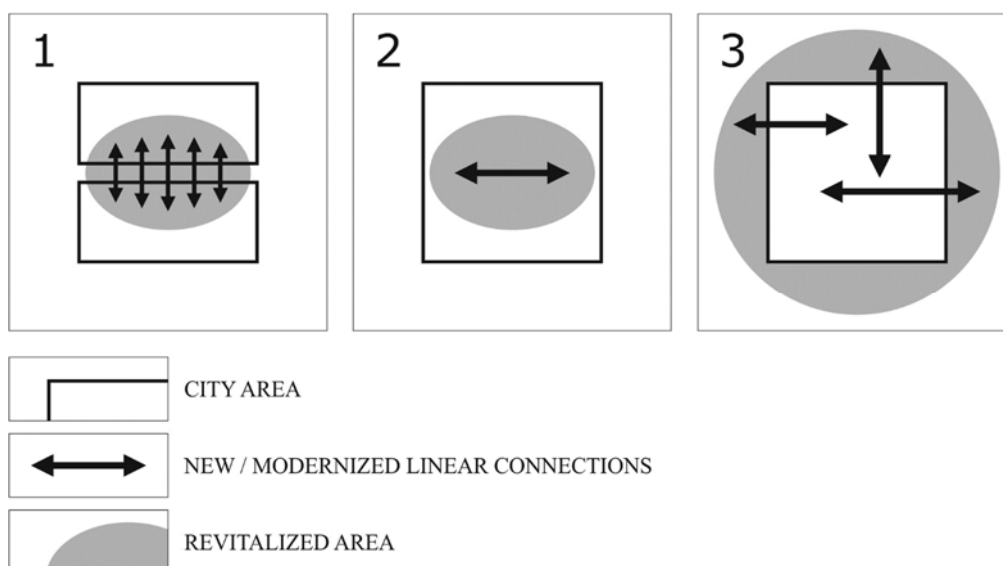


Figure 1. Spatial types of linear revitalization

Actions related to the first group are focused on crossing the existing barriers and connecting in a physical, functional, mental and visual way city structures fragmented by the different kind of barriers (like transit and main roads, railway tracks, rivers, embankments). During the linear revitalization, the barriers are being transformed into the strips connecting the different fragments of the city, facilitating its physical and functional cohesion.

Within the first group we may define such cases, as:

- connecting fragmented city structures through the activities within the barriers and in close surroundings (figure 2)
- crossing the barriers only in chosen crucial places, assessed as the most important for the city functioning (figure 3).

The positive effects include better functioning of connected structures, ensuring the safety and the comfort of using the neglected “in-between” areas, supporting mix land use, humanization of built-up areas due to landscape architecture and greenery, enhancing the quality of different elements of built environment within the barriers and around, minimizing noise and air pollution, social cohesion, the increase of the economic value of land being until now neglected and of inadequate land use. Public spaces should be created as an attractive continuous system with comfortable connections, accessible

for disabled, guarantying safety. The additional advantage is ensuring the even terms for disabled (recommended by the European Union), creating the city that is comfortable for different groups of people (disabled, children, elderly).

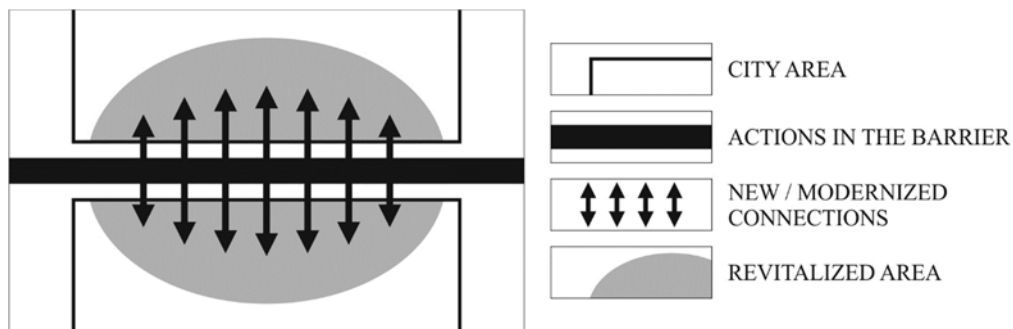


Figure 2. Connecting fragmented structures through the activities within the barriers

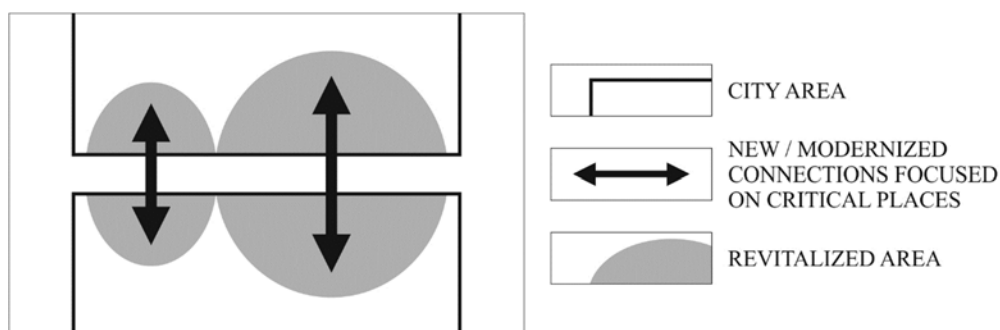


Figure 3. Crossing the barriers in chosen crucial places

The actions within the second group (connecting fragmented city structures) are focused on connecting effectively all city structures, enable and enhance the open flow of the city citizens, goods, information, and strengthen the weak/poor abandoned city parts. The development of public transport and public spaces connecting separated districts is necessary. Within the second group we may define for example:

- connecting the city centres with chosen districts (figure 4),
- connecting the different revitalized areas with each other (figure 5),
- connecting the different revitalized areas with other city districts,
- connecting fragmented city centres,
- connecting the city by modernization of crucial places (points) of main roads, what enables theirs better functioning,
- connecting fragmented elements of waterfronts into the continuous system along the water,
- connecting with the city the abandoned and degraded suburbs,
- connecting with the city the other degraded buffer parts,
- connecting the separated fragments of natural systems within the city,
- creation of new natural systems,
- creation of new green and blue infrastructure systems.

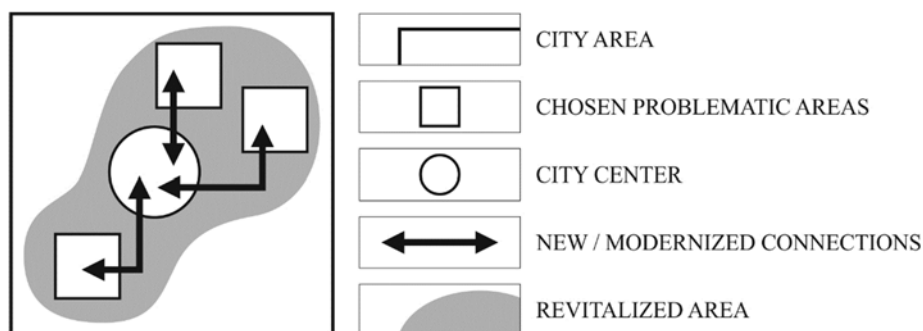


Figure 4. Connecting city centres with chosen districts

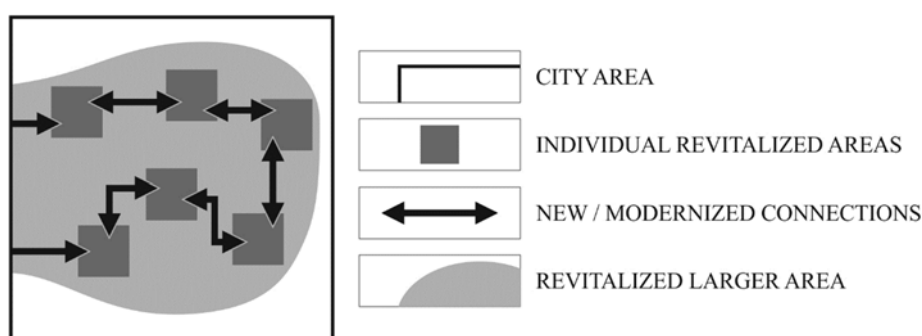


Figure 5. Connecting revitalized areas

Such linear connections may revitalize bigger surrounding area, or even whole city structure, stimulating the new development and new work places, activating different social groups on the areas which were until now abandoned, creating better access to the centres and recreational areas. Very important aspect refers to ensuring the continuity of natural systems, enabling and facilitating their functioning, what in consequence helps to improve city climate and health conditions, due to better wind flow and air rotation.

The actions within the third group (connecting the city with its surrounding) are focused on enhancing the positive relations between the city and its surroundings. They refer as well to the close neighbourhood (different kinds of buffer zones, natural surroundings), to the metropolitan area in the case of bigger cities (small cities and settlements) and to the broader regions. Within this group, some examples may be defined:

- creating linear buffet zones, especially in the neighbourhood of the protected/valuable natural areas or industrial areas (figure 6),
- creating the new linear connections during the process of urban waterfronts regeneration, enabling connecting the city with the water (figure 7),
- creating the new linear connections between the city and protected/valuable natural areas in the neighbourhood,
- connecting the city with the metropolitan area through new transportation systems.

These actions may facilitate protecting neighbouring natural areas, resources and values, providing better access to recreational areas, integration built-up areas with natural environment, better comfort of using buffer zones, facilitating the access to the main city from small cities and settlements in the region, facilitating the access to the water in case of waterfront revitalization.

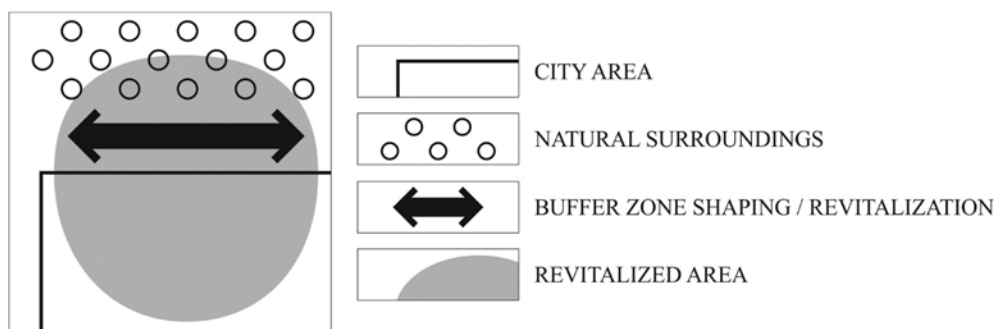


Figure 6. Creating linear buffet zones

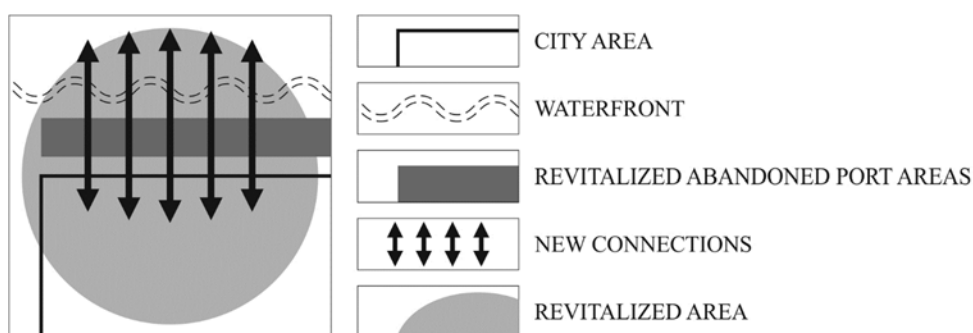


Figure 7. Connecting the city with the water

All the activities within the different types of linear revitalization should be supported by creating new or modernization of existing public transport systems, attractive and save public spaces and connecting fragmented natural systems. Different pro-ecological solutions, like green and blue infrastructure, better land-use, landscape architecture and art in public spaces should be supplementary tools.

#### 4. Case study. Kwiatkowskiego Route in Gdynia, Poland

##### 4.1. Introduction

The chosen example describes the problem of dividing the city by new roads and the need of connecting the city spaces. Kwiatkowskiego Route is situated in Gdynia (250 thousand inhabitants), big modern polish port city located in the north of Poland. Kwiatkowskiego Route in Gdynia crosses 3 types of land use: port and industry area, chaotic residential and services area and the forested hills (figure 8). The hills of many environmental and landscape values, being the popular place of recreation for habitants of Gdynia, are protected as a TriCity Landscape Park.

##### 4.2. History

The history of Kwiatkowskiego Route starts in 1960/70, when the idea of new connection of Gdynia Port and the national road system was implemented into spatial plans. Construction stage of the first fragment started in 1974 - 1980. In the 80's construction was abandoned because of the economic reasons. In the same time the environmental law changed. The establishment of Tri City Landscape Park took place in 1979. In 1991 Gdynia Authorities started the efforts to construct the final part of the road. Few alternatives were considered. Due to the new environmental law, Environmental Impact Assessment (EIA) procedure started in 1993. Authorities of Gdynia have chosen the alternative crossing forested hills. In 1996 Landscape Study within EIA was conducted to protect Tri City Landscape Park. In 2000, the Minister of the Environment gave approval for deforestation. In 2001 public protests

cumulated, 88 appeals against deforestation and construction of Kwiatkowskiego Road were submitted to the City Council and to the Highest Administrative Court. They all have been rejected by the courts and the City Council. Deforestation took place in 2005. In 2006/2007 construction phase started. After 34 years of its history, in 2008, the road construction was finalised and the new connection was opened. The history of Kwiatkowskiego Route shows the complexity of circumstances which resulted in many spatial, environmental, social and visual problems.

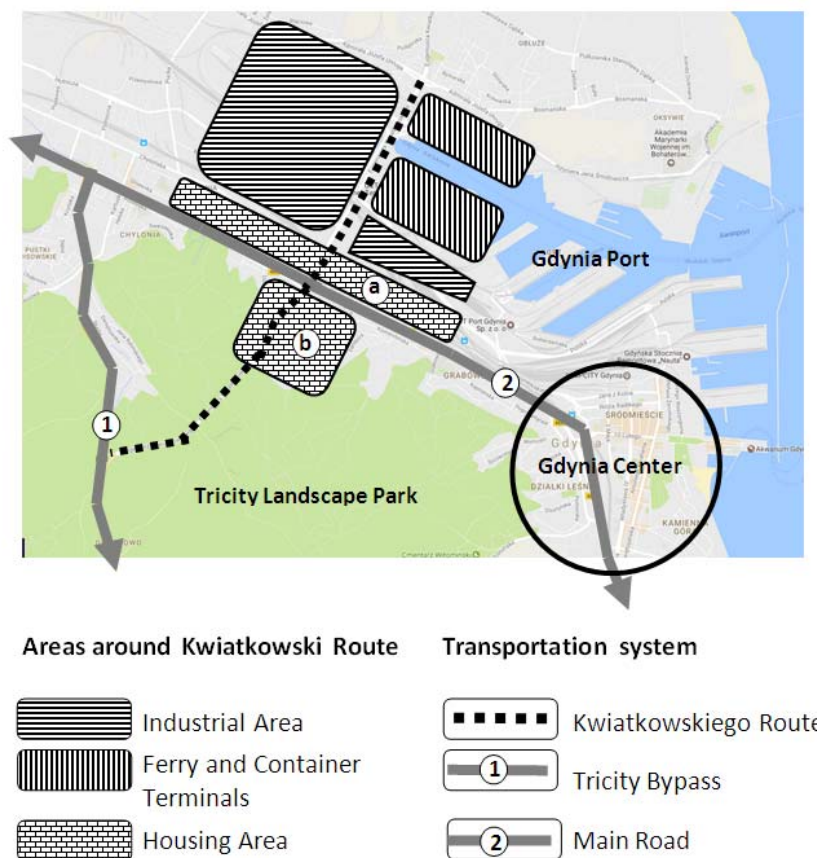


Figure 8. The surroundings of Kwiatkowskiego route in Gdynia

#### 4.3. Problems and threats

Each fragment of Kwiatkowskiego Route caused different problems. Some of them appeared at the first fragment, before EIA conducting, some after the final part construction, despite EIA procedure. The most important of them relates to the residential and recreational areas. They have been fragmented by multi scale engineer objects like long viaducts separating housing area from the city (figure 9, 10), big-scale viaducts of 14 and 30 m height and 371 m length which cut the forest (figure 11), embankments, pits of 14 m deep and 60 - 100 m length, stabilization walls of 8 m height and 40 m length or 5 m height and 100 m length, noise barriers of 4-5m height and 1800 m length (figure 11).





Figure 9. Kwiatkowskiego Route – the long technical barrier separated residential areas from the city structure



Figure 10. The abandoned and degraded land around Kwiatkowskiego route in Gdynia



Figure 11. Fragmentation. The big-scale viaducts fragmented the protected area of Tricity Landscape Park, the long and high noise barriers fragmented some city structures

Residential areas have been threatened by typical environmental impacts, like noise and air pollution, vibrations, light pollution. Some mitigation measures had to be constructed in some fragments of the city, like noise barriers, but they affected in a negative way the city landscape. As a result of the road barrier, many problems can be seen in the areas surrounding Kwiatkowskiego Route, like architectural banality, accidental mixture of different functions and forms, lack of good landscaping. They all create the image of chaos. The most negative environmental and landscape threats took place in forested area of Tricity Landscape Park, despite the special landscape study, which was conducted as a part of EIA. Some impacts were minimized and mitigated, due to the project of landform and land cover (greenery). Implemented mitigation measures are the results of landscape study, like landscaping of slopes instead of vertical walls, slopes under the viaduct instead of the vertical high stabilization walls and the landscaping of the hill at the end of the valley, instead of cutting it. But some negative impacts were impossible to avoid. The road caused the fragmentation of forested ecosystem, deforestation, destabilization of geological structures (caused by pits, slopes, bridgeheads and pillars construction),

erosion processes, underground water level changes, serious landscape changes, pollution of air, noise, vibrations and in consequence negative effects on flora and fauna.

## 5. Results and discussions

The presented case study illustrates the issues being the result of cutting the city structure by the road, showing the spatial scale, magnitude, and diversity of problems caused by linear structure dividing the city. Similar or other problems may be the effect of many kinds of barriers. Neglected and degraded spaces and environmental issues occurring in the cities divided by barriers are becoming a serious threat to the city image and functioning. Therefore, many questions are arising according to the problem of city disintegration. How to connect fragmented structures physically and functionally? How to minimize conflicts caused by fragmentation? How to stop disintegration and repair aesthetic disturbance and ugliness? Scientists and practitioners try to give adequate answers.

The need of city cohesion has been underlined e.g. in one of the most important planning European document, The New Charter of Athens 2003. The vision of European contemporary city focuses on the Connected City [8]. LEIPZIG CHARTER on Sustainable European Cities [9] stresses the need of territorial cohesion. Many scientific conferences are focused on methods of transforming and shaping different city corridors and networks, e.g. the theme of 5th Fábos Conference on Landscape and Greenway Planning was Corridors of Change and Resilience [10].

There are many ways to connect physically city structures. Urban design is indicated by Charter of Athens 2003 as a key element to break down the isolation between parts of the city and to achieve continuity. Charter states, that “through careful planning and other appropriate interventions, the spatial networks in and around cities will be enhanced” [8]. LEIPZIG CHARTER on Sustainable European Cities states that territorial cohesion can be achieved e.g. by high-quality, user-oriented public spaces and efficient and affordable public transport system [9]. Greenway planning for linear corridors across multiple scales, landscape planning protecting ecological integrity and ecosystems, including e.g. green infrastructure and ecological networks, and landscape design along the corridors are recognized as important tools [10]. Benedict and McMahon indicate green infrastructure as a tool linking landscapes and communities [11].

All these actions could be implemented to solve the problems caused by Kwiatkowskiego Route. They all fulfil the idea of linear revitalization. It proves that linear revitalization can be effective tool in case of city fragmentation. Linear revitalization enables integrated approach and coordinated actions of continuous character along the barriers, which may help to solve many functional and visual problems.

## 6. Conclusions

Contemporary cities are being fragmented by different kind of barriers. Many of them cause negative spatial, environmental, socio-economic, mental and landscape impacts. It is impossible to minimize them by accidental, not coordinated and scattered actions. Only the complex approach guarantying integrated efforts along the whole length of barriers may solve conflicts and mitigate problems. Concentrating these efforts within the chosen linear structures of the cities, where the problems are most serious, gives the chance to transform the barriers into the connecting fabric.

In such cases, linear revitalization seems to be an effective tool in mitigation spatial, technical, environmental, socio-economic and visual problems, appearing as a result of city fragmentation. Its implementation may bring to the city many profits. The general benefits relate to the better access to work places, services, culture and recreation, and enhancement of the role of landscape in city development processes, creating new visual values and improving city image and better life quality for inhabitants.

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