

The Importance of Brownfield Regeneration and Improvement

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Abstract – this research aims to explore the historical development, current situation, weaknesses and strengths of brownfield revitalization, as well as threats and possible solutions. Current situation in legislation and real life has been viewed, successful solutions globally and particularly in Latvia have been explored, innovation ideas, problems and recommendations for the improvement of the situations have been researched.

Keywords – architecture, brownfield, revitalization, society.

INTRODUCTION

The topic is relevant globally and particularly in Latvia. Degraded zones and objects are a long-term problem, which is further affected by incapacity of local market to provide a productive use of them. Developments in this area can contribute to increasing economic recovery.

To the date there is no update on the current situation that would include the overview of importance of residential and public spaces in the urban environment and historical and current problems in the restoration of degraded sites. The study is based on the book by O. Buka and U. Volrats “Pilsētībūvniecība” [1], handbook “Degradētās teritorijas” [16], “Riga degraded objects and territories revitalization program” [10], and Latvian state laws. The subject of the research are brownfields in a historical and modern days context. The aim of the research is to explore the importance of brownfield revitalization and transformation for public uses, their historical development, current situation, weaknesses and strengths. In order to achieve this goal the following objectives were set: get acquainted with theoretical materials and legislative conditions on the particular topic; identify possible measures for the rehabilitation of brownfields and sites; identify the current level of development and research of the revitalization process; discover successful examples in Latvia and elsewhere in the world; gather possible solutions, suggestions and improvements. Research was made using design thinking, informational and digital analysis, and research and data summarizing method.

This paper is a research on study in the field of engineering and technology on the current state of brownfields and revitalization measures in Latvia. It also researches what has been officially documented and implemented to improve the situation.

I. MATERIALS AND METHODS

In order to achieve reliable results thoroughly selected materials and methods were used, as well as a methodology was developed. The beginning of the research first uses the design thinking method in order to create a comprehensive structure. It puts the real needs of people in public and private spaces in the

centre. After that literature and materials for an in-depth investigation of the situation were selected and classified according to their content: history of brownfield emergence and examples of good practices, brownfield transformation into public buildings and public open spaces. The research and analysis of created sources include digital analysis, analysis of legislation and good practice examples, global analysis on degraded territory revitalization and territories in Latvia in particular. In the concluding part the summary of the obtained information and results of the analysis are provided, as well as conclusions are given.

II. GLOBAL ANALYSIS OF DEGRADED TERRITORY REVITALIZATION

The existence of brownfields is one of the consequences of economic development and humankind activity. It includes over-exploitation of natural resources that is focused on maximizing profits and developing short-term architectural solutions rather than the long-term ones. This tendency can also be observed from a historical perspective [15].

Rapid industrial and technological development in the 19th–20th centuries contributed to the increase of urban population. The boom in industry and technology led to rapid changes in the structure of cities [1, 15–25], [3]. Development of industrialization varied in different countries, most intensely in UK and the United States, with emphasis on Detroit (USA, Michigan). It is one of the most influential industrial cities of the last century. Nowadays, due to open market’s global economic recession it is one of the fastest shrinking cities in the world, locating huge amount of degraded sites [24]. Due to changes in economy, standards, governance and lifestyle elsewhere in the world, abandoned or not properly used brownfields developed. The emergence is particularly rapid in the 80s and 90s of the 20th century as a result of deindustrialization [7].

On a global scale, brownfield problem and possibilities of regeneration began to play an important role in the 70s of the 20th century. Officially the term “Brownfields” has been used in the US since 1992. Most experience in this area is located in the US, Canada and the UK [22, 2]. In this article the term brownfield is used to define any territory, land or premises, that has previously been used or developed and is currently derelict, vacant, or not fully in use and often may be contaminated. Therefore, for such an area to be usable and beneficial again, intervention and revitalization are necessary [11].

Based on the principle of the European Union (EU) subsidiarity order, to ensure the successful rehabilitation and reintroduction of brownfields and sites, the existing problem needs to be identified at both national and regional level.

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Fig. 1. History of the “Titanic Quarter” [17].



Fig. 2. The Titanic Museum in Belfast [17].



Fig. 3. Playground at “McLennan” Recreation Park [23].



Fig. 4. “McLennan” Recreation Park [23].



Fig. 5. Annapolis Solar Parks [18].

Accepted standards, practices, norms and understanding of degraded sites vary from country to country, making it difficult to collect data in a comparable and analytical way.

It should be noted that brownfield projects are dependent on the changes in the real estate market and the economic situation of the country. Successful realization is facing several risks: financial expensiveness, time-consuming preparations, cultural heritage with limitations, lack of experience, opportunities for cooperation and interest, legislative conditions and managing authorities. Technically, biggest obstacles to brownfield redevelopment are problems with site integration in the region, real estate aspects and exaggerated contamination claims, even though it is not the main problem. Ownership of brownfield sites is important, as it often defines further land usage [16].

The degraded areas, similar to the rest of the spatial environment, are in a process of constant changing. Consequently, even if a country has a highly developed policy and management of brownfield redevelopment, not all changes can be predicted and regulated. UK is one of the few countries with well-developed long-term land usage policies, support programs for the improvement and reuse of brownfields, as well as national monitoring of revitalization. In UK the management of degraded property is facilitated by the NLUD (National Land Use Database). In 2005 and 2006, UK Partnerships developed and published a comprehensive national brownfields strategy that analysed future actions and policy in order to accelerate the development of brownfields.

Despite active efforts, brownfields decrease in UK is relatively small, but on the other hand it barely increased [16].

Examples of good practice were selected from the US, Canada and the UK, based on the fact that the most experience in brownfield renewal (practical, institutional, on the development policy level) has been accumulated in these countries. One most impressive and typical revitalization project was selected from each of these countries.

One of the impressive projects is the revitalization of the Titanic Quarter in Belfast, Northern Ireland.

It started in 2007 with the aim of restoring around 75 ha of waterfront land. Belfast was once considered the world's largest linen processing and shipyard centre. One of the largest working shipyards in the world – Harland & Wolff – is still located in the city. In 1911, the world-famous ship Titanic was built there (see Fig. 1). As part of the project the Titanic Belfast Museum (2009 – 2012) was created in place of the former Harland & Wolff Shipyard (see Fig. 2), which is important in the project, being the central element of the Titanic Quarter [17].

A project in Kitchener, Canada, transformed a former landfill site into a McLennan multifunctional recreational park (2007–2009) (see Figs. 3 and 4). It covers 39 ha and offers a variety of activities for children and adults [23]. The brownfield has become a place for leisure and socialization. It is popular in the United States of America to install wind power or solar panels in polluted or potentially contaminated areas. According to EPA,



Fig. 6. *Spīķeri* Quarter before revitalization [25].



Fig. 7. *Spīķeri* Quarter after revitalization [25].

the largest solar power project Annapolis Solar Park (2017–2018) (see Fig. 5) is located in a closed landfill in North America [18].

Proper land restoration and improvement projects contribute to the sustainable development of environmental, social and economic sphere.

III. ANALYSIS OF DEGRADED TERRITORIES IN LATVIA

Two major periods in Latvian history have buildings and territories that are related to creating the vast majority of degraded lands found today. The first phase refers to the active industrialization period of the 19th century, when industrial zones formed around city centres. As the number of job opportunities increased significantly, population rose as well. Consequently, rapid construction of residential buildings took place. The second stage is the development of Soviet-era industry with the use of areas and resources [2, 1–10].

Following the collapse of the Soviet system in the 1990s, Latvian industry faced major changes [2, 1–10]. In Latvia increased attention to the problem of brownfields has started with the arrangement of polluted territories [22, 2].

Regulation No. 240 of the Cabinet of Ministers “General Regulations for Spatial Planning, Use and Construction” dictates the terms regarding risks and contaminated sites [6]. Regulation No. 500 “General Building Regulations”, Chapter XV “Arrangement or demolition of a structure which has been fully or partially destroyed, dangerous or damaging the landscape” and Cabinet of Ministers Regulation No. 474 “Regulations on Accounting, Protection, Utilization, Restoration of Cultural Monuments and Designation of Environmentally Degradable Object” establishes the procedure for local governments when dealing with slums [4], [5]. Under the “Law on Land Management”, landowners have an obligation to take measures to prevent degradation of the land in their ownership. Municipalities are required to develop and approve measures for the usage of brownfields as well as document existing degraded territories. Starting from 2018, the government has to prepare a 5-year land survey, including information on brownfields and their areas [12]. In the same year the idea of creating a brownfield database was born. However, it has not been

developed so far. The authorities responsible for brownfields are the Ministry of the Environment, the Ministry of Regional Development and Local Government, the Regional Environmental Boards, the municipalities and owners [16].

The evaluation of the current situation leads to the conclusion that there are shortcomings in the designation and assessment of brownfields. The existing criteria on which the assessment is based are meant for the city of Riga within the framework of “Riga City Rehabilitation Program for Brownfields and Territories”. As a result, the evaluation is subjective and it is not possible to produce accurate statistics at the national level. Legislation focuses on inappropriate use and pollution of land and water, but little is known about degradation of landscapes containing old buildings and debris. There are shortcomings in planned processes that affect successful reintegration and rehabilitation of brownfields. Some plans do not contain information on degraded areas or sites, both textually and graphically, suggesting that such areas either do not exist or have not been identified [9]. On the positive side, there has been a noticeable trend towards providing more detailed information in recent years. Cities strive for growth and aim to create accessible and attractive environment for public. As examples of good practices in the area of brownfield regeneration in Latvia were selected the most significant projects that occurred in recent years in Latvia’s capital city Riga. Those are the revitalization of the *Spīķeri* Quarter (2012–2013), *Grīziņkalns*, and *Miera* Garden (2011–2015).

Since the 14th century, the *Spīķeri* Quarter served as a place for loading and unloading cargo ships, as well as several warehouses. The Quarter itself dates back to the second half of the 19th century, when similarly shaped warehouses were built there. During the Second World War, the Ghetto of Riga was created in the area. The *Spīķeri* Quarter was in a very poor condition and in modern days was recognized as a degraded area (see Fig. 6). The aim of the project was to ensure the revitalization of the Riga city degraded quarter in accordance with the city centre and its zones. As a result, it has been transformed into a publicly accessible cultural, educational and recreational space (see Fig. 7) [25]. The historical core continues to be one of the most significant public area of city [20].



Fig. 8. *Grīziņkalna* and *Miera* Garden territory (before revitalization) [26].



Fig. 9. *Grīziņkalna* and *Miera* Garden territory (after revitalization) [19].

A successful revitalization project was done in the degraded territory of Riga city – *Grīziņkalns* and *Miera* Garden. In the past, shortage of funding was the reason of lack of the development (see Fig. 8) [13]. The protected zone of the historical centre of Riga includes both *Grīziņkalns* and *Ziedoņdārzs*. The historical centre of Riga has become the UNESCO World Heritage Site in 1997 [21].

Revitalization is essential due to the importance of cultural and historical heritage preservation. This is possible only if projects are successful (see Fig. 9). Revitalization projects are also taking place in other parts of Latvia [14]. The overall situation in Latvia indicates the tendency of large cities to have an improved environment. This is poorly reflected in small towns or rural areas. It is important to focus on the overall situation and to research possible solutions at a national level. The existence of brownfields intensifies the negative impact of the land organization, quality and efficiency in the usage of the environment. It results in deterioration of physical and aesthetic quality. Ongoing processes create challenges to the organization of the city and environment by increasing traffic volume, as well as causing damage to the national economy [8]. Revitalization of brownfields require careful elaboration of a specific strategy or program, as well as supporting measures that provide further development. Identifying brownfields and sites is an important part of planning that is closely linked to municipal development programs and future proactive activities.

CONCLUSIONS

1. Revitalization of brownfields improves the environment by increasing the attractiveness of the overall image allowing sustainable development. However, it requires long-term preparation, studies, a well-thought-out strategy, in addition to well-developed legislation to build upon.

2. Redevelopment of brownfields is a complex process, positive outcome of which depends on many factors, such as current economic situation, sources and opportunities of financing, activity of the real estate market, cooperation, accurate decisions and understanding of the situation by the parties involved.

3. The degraded areas, like the rest of the spatial environment, are in a process of constant change. Consequently, even if revitalization policies and management are well developed in the country, not all changes can be predicted and regulated.

4. Regeneration of brownfields in every country should be included in the government's program, and listed as a separate issue in the policy of sustainable land use and urban regeneration.

5. Production flourished in Latvia during Soviet Union period, which is one of the reasons why the majority of brownfields appeared after its collapse.

6. The revitalization processes carried out in Latvia's territories are characterized by preservation, reconstruction and re-use of old building elements. It is particularly important to continue revitalization of historically important sites in order to preserve cultural heritage.

7. Complete demolition of degraded buildings in order to create new objects is more common in the restoration of commercial and residential objects, industrial and Soviet-era building zones.

8. Research into the problem of land degradation and its impact in Latvia relates more to soil degradation, pollution and preventive measures.

9. There are shortcomings in the identification and assessment of brownfields in Latvia, no proper information regarding measures that have been taken has been provided. The criteria are not developed at national level, as it is intended for the City of Riga within the framework of the revitalization program, and is generic, encouraging a subjective view.

10. Overall, in Latvia brownfield revitalization is increasing gradually.

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It is too early to talk about awards as scientific research is still ongoing as well as negotiations with the Latvian Designers' Union are taking place.



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