
BROWNFIELD INVESTMENTS AS POSSIBILITY OF REVITALIZATION AND SUSTAINABILITY OF LOCATIONS

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ABSTRACT

Investments for revitalization of locations through Brownfield investments provide an opportunity to establish and test new sustainable development practices. The economic advantage of analyzed Brownfield investments is that there are already certain capacities and infrastructure in a specific location. The research found that the funds invested in the cleaning of the terrain, waste treatment with the so-called. "Wild" landfills, in adaptation of buildings, arrangement of green areas, improvement of infrastructure and the like, have economic and financial justification. In addition, a number of other qualitative effects of general interest have been highlighted. The effects of this investment are considered from socio-economic, environmental and other aspects, as well as to the development of local economy and environmental protection. In addition to the ecological and economic aspects of investing in Brownfield investment, special attention should be paid to risk management and social aspects of local sustainable development.

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Introduction

Brownfield locations pose a particular challenge for investors in order to revamp and unused and neglected buildings and land and make it usable and useful again. Brownfield locations directly affect to water, soil, and even air, but they also have subtle effects on the environment (infrastructure hindering the efficiency of urban form), and even the social and economic impact, which is much more difficult to measure

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because it is a part of the benefits of Brownfield regeneration (Ferber & Nathanail, 2006). Brownfield locations are affected by: environmental, sociological, economic, technical and architectural-urban factors. Revitalization, or re-animation of Brownfield location, has positive effects at many levels. Unlike Greenfield locations, abandoned and undeveloped locations come with the risk of contaminated land and the cost of demolishing and cleaning (Gorman, 2003). Disposal of waste in inappropriate places leads to degradation of soil and pollution of water and air, as often significant quantities of waste are disposed of in unapproved places such as rivers, rural landfills, land near roads, in addition to embankments, boreholes, bays or pits, abandoned buildings, etc.

The main challenges of waste management in Serbia, especially in rural areas, still relate to ensuring good coverage of capacity to provide basic services such as collection, transportation and sanitary waste disposal. It is estimated that in Serbia there are over 4,000 illegal, "Wild" landfills. According to official estimates, the total annual damage caused by improper waste management in Serbia is between 0.40-1.10 percent of GDP (Filipović et al., 2016). Almost all European countries have recognized the effectiveness of land use and recording ecological pollution of sites as issues of national interest. These sites pose a particular challenge for national and regional policies that should facilitate the reintegration of rehabilitated sites into the real estate market and to ensure their re-economic benefits (Lorber, 2011). The development of world locations is based on the principle of taking free (Greenfield) areas, which results in a discontinuity in the urban structure, visual disruption and aggression affecting the identity of the environment and human health. On this basis, there is a need for orientation towards existing, underutilized areas, to improve the environment (Perović & Kurtović-Folić, 2012).

Brownfield locations are created under the influence of social and economic restructuring of the whole community. Weathered soil, low standards, the disintegration of society and the steady increase in the number of unemployed people has a detrimental economic impact on the physical environment (Ferber & Nathanail, 2006). The main objective of urban regeneration is a response to the complex dynamics of contemporary life and to issues of revitalization of economical, environmental, social and cultural functions (Perović & Kurtović-Folić, 2012).

The EU Environmental Liability Directive (2004/35/CE) provides a good basis for the prevention and elimination of environmental damage based on the "polluter pays" principle. Costs that address the issue of environmental liability, in some cases, exceed the value of the assets in many cases, so that their precise calculation requires determination of the ecological, physical, geological and hydro-geological characteristics of the site, as well as the type and quantity of harmful substances. Brownfield locations are a challenge for investors, due to certain advantages, as well as a range of risks. Revitalization benefits of Brownfield locations are: quality of locations, less risk of low attendance (especially for mixed use), a steady increase of property value, lower investment costs due to the available infrastructure, the financial support of the local community and a longer life cycle of historically significant objects (Stojkov, 2007). Urban economic

development is a complex series of processes of growth and change, whose effects are impossible to predict even in the near future, and the process of regeneration of Brownfield locations is often complex and unpredictable (Bacon et al., 2008). The level of subsidies necessary to use private money can be large or small, depending on the size of the investment (Paull, 2008). Some of the issues and circumstances to consider when allocating costs and risks between owners, investors, and local or government authorities are: Is it suggested to sell or lease revitalized property if it is a local self-government? Are there other ways to benefit from increasing the value of assets in order to make up for public sector funds invested in the revitalization / preparation of the site? Is it necessary to form a public-private partnership for Brownfield Investment Management? In this paper, an attempt was made to find out the answer to some of the above questions. The main objective is to take the case out of practice, to analyze and analyze the calculating and qualitative effects of the revitalized locations.

Materials and methods

For each investment, it is important to ensure financial sustainability, that is, there is consistency between the expected cash inflows and outflows, in each individual observed year of the analyzed period. For research in this paper, data collected by survey and interviews on the rehabilitated and revitalized site of 1.40 ha were used and is located in the southeastern part of the Republic of Serbia. At the location there was abandoned water well around which the waste was illegally dumped, so-called "Wild" landfill. Not far from the waterfall there is an ethnically owned restaurant. At the same location there is an entrance to the natural cave. With a private-public partnership, the landfill was cleaned, the buildings renovated, the museum and the ethno restaurant were opened and the location is decorated and today is the place of numerous visitors. On one side, the money from the local self-government budget was invested, and the other from the funds of the owner of the facility. Regardless of ownership and public-private partnership relationship, this paper focuses on the potential effects of investing in Brownfield location. The economic effects are calculated by the calculative procedure. Other effects are expressed by qualitative indicators.

Results and Discussions

In order for revitalization to be considered profitable, the value of the revitalized land, after deducting the cost of preparation and the cost of restoration (revitalization), should be greater than zero. The first examples of the revitalization of abandoned buildings are known in the United States, then in Western Europe, and later they began to pay attention to them in the countries of Central Europe and countries in transition. Brownfield sites were created as a result of earlier use and abandoned location. They can have negative ecological, economic and social impacts on the community. Such locations often have more owners and most of them do not want to invest anything in the real estate, while changes in the market and innovations in the repair technology do not bring satisfactory profit in sales. Multi-year non-use of objects creates an ecological,

social and aesthetic problem. Their revitalization has been delayed and hampered by legal, financial and environmental issues. This weakens the competitive investment position of the cities and regions of South East Europe as a European region (Lorber, 2011). A good investment climate, as one of the factors of the country's development strategy and recognizing the benefits that Brownfield investments bring, would enable economic growth and integration flows of the economy with the goal of joining the global business system (Simić, 2008). Revitalization of Brownfield sites leads to an increase in the value of real estate at neighboring locations by 5-15%. In some cases, Brownfield investments can become a backbone to create a positive ambiance for new investments. Investing in a Brownfield location can open access to the local community and for non-commercial projects, such as parks, public areas, roads and residential buildings, which due to proximity to the city center could not be used as production facilities. The experience of some countries shows that the development of free zones often did not give the expected effects due to insufficient and restrictive legislation, but also the ineffectiveness of the management structures (Savanović, 2008).

Brownfield locations require various forms of public intervention. The complexity of location problems, uncertainties, and costs associated with their revitalization and reuse, and especially increased risks, seem to be unconstrained for private direct financial investments. In order to overcome these problems, it is necessary to establish a public-private partnership between private investors and the state. In the territory of the Republic of Serbia, there are a large number of abandoned buildings, facilities, warehouses and similar former combinations / enterprises, cooperatives, public and social institutions such as hospitals, schools, homes of culture and the like (Kaufman & Cloutier, 2006). The most common reasons why investors do not opt for investing their assets in our country are unresolved property-legal problems. The protection of property rights includes, first and foremost, the absence of danger of expropriation, the independence and irreversibility of the judiciary, and the ability of individuals and companies to enforce contracts (Estrin & Meyer, 2011).

Brownfield investments in the revitalization of locations can be classified as investments that, in addition to ecological effects, generate net revenues. By realizing such investments, positive effects on the effectiveness and efficiency of sustainable use of natural resources, improvement of the quality of the environment and general, socio-economic and economic development of the society (Brzaković et al., 2016). For the successful realization of such investment projects in practice, it is necessary to provide measurement of important parameters: cleaning of locations; investments in the reconstruction of buildings; greening and surface editing, and the effects of significance for location and local development, etc. The basics in making decisions for the realization of such investments in practice are indicators of their economic viability. The determination of economic indicators of investments is based on determining the differences and the relationship between the amounts of investment investments made and realized cash receipts during the investment period (Sredojević et al., 2017). In the case of public-private partnerships, with key indicators of economic justification

and financial acceptability of the site, the analysis should show the financial effects that can be shared between the public and private sectors within the partnership. With the increase of demand for private sources and financing of building new public infrastructure and investments in goods in general use, as well as for providing quality services of general interest in conditions of insufficient budget funds, public-private partnership becomes a novelty in Serbian business practice (Stanković & Vignjević-Dordević, 2013). The location that is the subject of research in this paper has certain specifics. As a key place for waste disposal was the coast of the mountain river where the abandoned water well and wooden bridge are located. In the immediate vicinity there is a privately owned building, and at the same location there is an entrance to the natural cave. With the cooperation of the private owner and the local self-government, the landfill was cleaned, the terrain was rehabilitated, the river and the surrounding part were renovated waterfalls were renovated and converted into a museum a private facility was renovated and opened a restaurant and the entrance and inside of the cave were arranged. The final location is regulated, perennial plants are planted, individual grass surfaces are planted, benches and other elements for visitors are planted. Today, the site represents a place of various visitors - tourists, mountaineers, scouts and other lovers of nature and cultural values. The structure of the main activities and the amount of costs per activity for the analyzed site are given in Table 1.

Table 1. Investments for landfill removal and revitalization of the location, 1.40 ha

Activities at the location		Amount (€)
1.	Loading and dumping garbage from an illegal landfill	1,100.00
2.	Cleaning the riverbed and arranging the flow of water	850.00
3.	Removing the remains of a wooden bridge and installing a new one	490.00
4.	Renovation and arrangement of wooden waterworks as a museum	1,250.00
5.	Repair and renovation of ethno restaurants with a garden	1,920.00
6.	Rehabilitation of the terrain and recreation paths	970.00
7.	Procurement of seedlings and planting of perennial plants	1,750.00
8.	Preparation and sowing of the surface under the grass	740.00
9.	Positioning the bench and waste bin	1,220.00
10.	Arrangement of the entrance to the cave and security elements	940.00
11.	Upgrading of accompanying canopies for ethno souvenirs	1,360.00
12.	Placing a board and other markings for the museum, the park and the cave	380.00
13.	Other costs (project and other fees, licenses, etc.)	330.00
		Total: 13,300.00

Source: Calculation by the authors

The economic benefits and costs of realizing such investments should be identified on a case-by-case basis, depending on the project goals, locations, businesses, and environment, all in accordance with the spatial plan, legislation, etc. The analysis should include socio-economic costs and benefits in relation to: users of such investment, the impact of environmental investments, economic activities at the site,

and others. Special attention is paid to the use of specific zones, for example, nature parks, protected zones, natural shelters, etc. By analyzing modes and shortcomings at a certain level, the potentials of such investments, the risks during their realization, as well as the possibilities of their sustainability can be estimated (Gajić et al., 2013). After the revitalization of the location, through the collection of services, tickets and other fees for visitors to the museum, Nature Park, cave visitors, as well as various services in the ethno restaurant, significant financial effects are achieved. Cash inflows, mostly, arrive during the tourist season, scout scouts, mountaineers, etc. in the period from March to November. Average cash inflows using the analyzed revitalized site amount to 5,700.00 euro per year. On the other hand, cash outflows for the use and maintenance of the location are generated throughout the year in this case they amount to 2,300.00 euro per year (Table 2).

Table 2. Economic and financial indicators of the revitalization of the location, 1.40 ha

Parameters of investing in the revitalization of locations	
Investments for recovery and revitalization of the site (€)	13,300.00
Average annual cash outflows for maintenance and use of the site (€)	2,300.00
Average annual cash flow from activity on site (€)	5,700.00
Non-rated benefits*	x
Economic and financial indicators of investment investments	
Average annual financial benefit from using the location (€)	3,400.00
Cost ratio: Benefit from a revitalized location	1.00:1.68
Coefficient of economy	2.48
Accumulation rate (%)	26.00

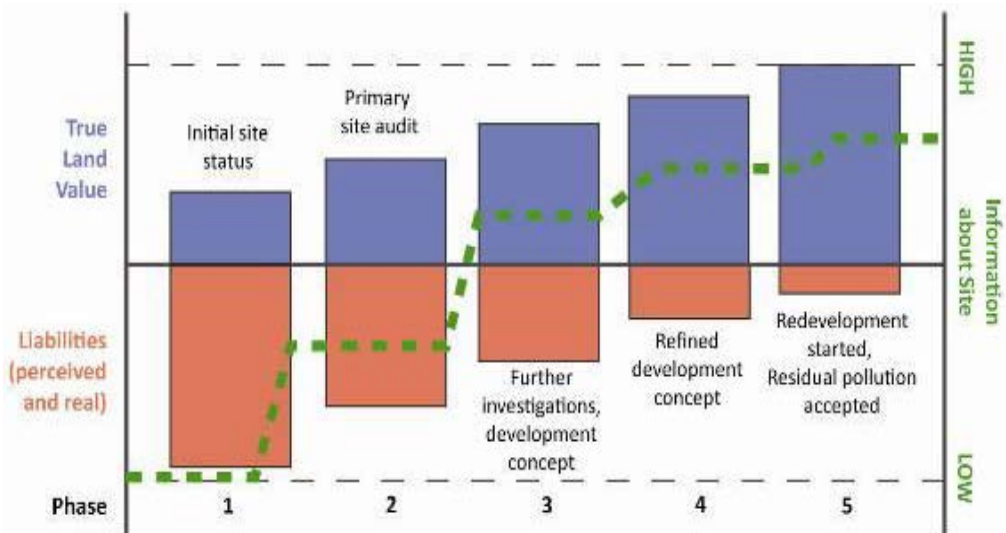
* Undefined benefits-the degree of preservation of biodiversity, soil, water and air, etc.

Source: Calculation by the authors

Using the revitalized location, significant effects are achieved by the financial effects of an average of 3,400.00 euro per year. Throughout the year, at a cost of 1.00 euro a gain of 1.68 euro is achieved. Apart from the coverage of regular annual issues, from a series of annual cash inflows, for every 100 euro of invested capital, 26 euro is allocated for accumulation. Also, this is a fairly economical investment, with the ratio of annual inflows and cash outflows to 2.48. Therefore, from the perspective of investors, investing in such an investment is economically justified. Revitalized location is an investment that will increasingly produce positive effects of general interest with years. Financial assets invested in Brownfield Investments have a beneficial effect on the environment, contribute to land conservation, reduce emissions, improve water quality, and the like. Economic analysis compares and evaluates all the advantages and disadvantages of the venture (Subić, 2010). Financial assets invested in Brownfield Investments have a beneficial effect on the environment, contribute to land conservation, reduce emissions, improve water quality, and the like. Economic analysis compares and evaluates all the advantages and disadvantages of the venture. For both public and private entities, parties should reach an agreement on the allocation of risks and benefits. The risk sharing

is most often determined by the interests of the parties in the arrangement and their ability to assess, control and manage the risks (Howland, 2007). By agreement on the allocation of risks, it is possible to establish a fair and sustainable way of dividing the benefits from revitalization. The way in which funds from local sources are stimulated to stimulate the private sector and reduce the risk to investors is a matter of legislation. Experience in the world shows the different possibilities for using incentive measures and public sector subsidies in the realization of Brownfield projects (De Sousa, 2006). Local governments can use financial, fiscal or planning instruments to reduce the cost of financing to the investor. For the revitalization and reuse of abandoned locations, examples of successful practice are studied and analyzed. Local self-government has organized and financed removal, illegal dumps and sanitation of terrain. It was not directly involved in the reconstruction and construction of facilities, but it helped the investor to issue building permits. The local self-government has come to help the investor to accelerate the process of planning and fostering sustainable development. The accuracy of remediation costs can be greatly improved by creating a good database and critical to risk planning and risk management (Figure 1).

Figure 1. Graphical display of the increase in the value of the revitalized location



Source: Customized view by authors made according to CABERNET, 2006

These measures are most often found in the environmental regulations of the building permit and are the obligation of the contractor to implement them during the preparation of the construction. During this phase, the costs are calculated accurately in order to make a negative investment balance against the excess of the value that is generated from the investment and future revenues of revitalization. The initial plans for rehabilitation and revitalization are further elaborated through an environmental impact assessment. The assessment takes into account the ecological value of the

site and analyzes the impact of revitalization on the environment, or the surrounding areas. A further step of research in this field is to determine the qualitative effects that are far more significant for the wider environment and the community. Investment in Brownfield locations contributes to the increase in economic development, the disposal of abandoned buildings, economic activities and through the increase in the number of jobs and investments. Increased investments through Brownfield projects contribute to the improvement of fiscal benefits, which can also be reported through: restitution of abandoned land for reuse, direct contribution to increasing local and state tax revenues. Important environmental, energy, economic, social and fiscal indicators of Brownfield effect and their effects are quantitatively listed in Table 3.

Table 3. Types of indicators and qualitative effects of Brownfield location

Types of indicators	Qualitative effects
Ecological and energy	Renovated field and reduced health risk; Better air quality and no spread of toxic substances; Better quality of water and the possibility of using sources; Preservation of agricultural land; Provision and conservation of natural habitats; Greater diversity of flora and fauna;
Economic, social and social	Revitalization of the environment and development of the economy; Visits to tourists and more activities; Better valuation of assets in the environment; Motivation of investors and incentives for employment; Development of awareness and education on the conservation of nature resources; Sustainability of the aesthetic and cultural value of the site;
Fiscal	Direct revenues through local taxes, taxes, etc .; Refund of external costs for transport infrastructure; Income tax after rehabilitation and re-use of property; Saving and improving the investment climate; Subsidies, premiums, loans, etc .; Ecological insurance, taxes, fees and other;

Source: View by authors

Investing in Brownfield locations leads to an increase in the value of assets, which through indirect taxation indirectly increase tax revenues of local governments. By encouraging investors to enter existing facilities and locations, where there is already existing infrastructure, it would become a great opportunity for the Republic of Serbia, a significant part of the stabilization, reconstruction and sustainable development of the country (Gligorijević, 2015). The revival of Brownfield sites has a fiscal impact, which involves generating new sources of local government revenues derived from investing in non-productive land and reducing the necessary investment in infrastructure. By encouraging investors to invest in Brownfield locations, where technical and traffic infrastructure already exists, it would become a great opportunity for the Republic of Serbia for economic growth.

Conclusions

At the local level, attraction of Brownfield investments can be stimulated through planning and various fiscal measures and land related policies. Approach pertains to the activities and cooperation with partners on the local community development. The revival of Brownfield sites has a fiscal impact, which involves generating new sources of local government revenues derived from investing in non-productive land and reducing necessary investment in infrastructure. By encouraging investors to invest in Brownfield locations, where technical and traffic infrastructure already exists, it would be a great opportunity for the Republic of Serbia for economic growth. The success in resolving Brownfield locations in all economies is based on cooperation and partnership between the public and the private sector.

The location that is the subject of this research is an example of good practice for public-private partnership in the realization of Brownfield investment in Serbian business practice. Local self-government participates in the division of risks, such as: providing necessary infrastructure, rehabilitation of the terrain, issuing necessary permits for parks, housing, recreation, cultural, tourist and other facilities. The advantages are that local self-government can, on the one hand, generate economic activity and improve social and environmental conditions, and on the other hand to minimize pressure on public finances. Obstacles to address Brownfield locations at national, regional and local levels, which many experts point out are: the lack and insufficient education of actors to foster resolution of this problem; insufficient information exchange; inexperience in the mentioned issue; insufficient understanding of the essence of the problem and the like. Addressing Brownfield's problems should also be found in programs, strategies, legal framework and support for investment priorities, with the exchange of experiences with countries that have addressed such problems, pilot projects and ongoing education.

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Conflict of interests

The authors declare no conflict of interest.

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