MAPPING OF INDUSTRIAL LANDSCAPE AND ANALYSIS OF URBAN BROWNFIELDS: TIMIȘOARA PERSPECTIVE

Liviu JIGORIA-OPREA
West University, Timișoara, Department of Geography, Romania
Email: liviuji@yahoo.com

Flavius Sebastian IGNEA
West University, Timișoara, Department of Geography, Romania
Email: flaviusignea@yahoo.com

Abstract. Started between 1970-1980 in the well-developed countries, the de-industrialization process covered Timisoara after 1990s. In most cases, industrial activities were suspended and spaces were abandoned or converted for other functions (residential, commercial etc.) There are some cases, where the industrial activities were refurbished, keeping the industrial function of the places. For the current research, all the industrial spaces from Timisoara were investigated using GIS techniques and from observation at the scene the main types of industrial landscape were established. From all, the brownfield type landscape, considered representative for the functional reconversion of the city, were analyzed. They represent an important land reserve, with obvious operational perspective and economical development.

Keywords: deindustrialization, conversion, urban regeneration, industrial district, GIS analysis.

INTRODUCTION

The 20th century represented a time of great changes for the entire world, a succession of events which lead to social, economic and technologic development. Human settlements considered important changes, which influenced both the geographic areas and the communities. The most important process was the industrialisation process which started at the end of the 18th century and determined important changes of the urban areas. At the end of the 20th century started the reversed phenomenon – the deindustrialisation.
1. CONCEPTUAL DEFINITION AND THE STAGE OF KNOWLEDGE

Deindustrialization represents both an economic and cultural transformation, being one of the most visible processes that have affected the majority of the urban centres. It is a process of shifting from an economic system based on industry to an economy of services and information. This process should be seen as an evolution and a progress of the society, as a new stage in the evolution of humanity. However, the effects of the deindustrialization are still visible and are often accompanied by certain negative consequences that redound upon both the human society and the environment (Bluestone, Harrison, 1982; Lever, 1991; Popescu, 2000; Vertova, 2006).

One of the main questions that appears in the deindustrialization process is what happened and what is happening to the areas that were once used by industry? To name these areas, in the last decades more terms have appeared, some of them being industrial landscape, brownfield or frishe. All these terms are used in the professional literature of different countries (brownfield – USA, frishe – France), and have some common elements, but also they employ some peculiarities that distinguish them from each other. If the industrial landscape has a larger significance and refers to the natural or urban territories that preserve essential components of the production process of one or more industrial activities (Law 6/2008, Chapter I, Article 3f.), the brownfield refers to the contaminated or potentially contaminated industrial fields that are abandoned at the present time (EPA, 2002), and the term frishe represents the areas that were used in the past, but are not used anymore, or are abandoned at the present time. Consequently, we will use the term of industrial landscape when referring to all areas which are still used or have been used for a long time for industrial activity and the term brownfield when referring to the areas which were used by industry in the past, but which are abandoned, unused and possibly contaminated in the present.

Using either the term industrial landscape or brownfield, the Romanian and foreign professionals have intensely debated the issue of the fields affected by the industrial activities in the last period of time, a series of works being produced: Ianoş, 1997; Parker, 1998; Popescu, 2000; Davis, 2002; Page, Berger, 2005; Chelcea, 2008; Lichi, 2011; Mirea, 2011; Wu, 2012 etc. Nevertheless, the term brownfield is not sufficiently tested and unanimously accepted yet. The main characteristics, that are generally accepted for a brownfield, are the following (Page, Berger, 2005):

- It has an industrial origin and represents the result of old industrial activity;
- It presents environmental problems, being contaminated or possibly contaminated as a result of previous industrial activities;
- It affects generally the urban environment, being predominantly localised inside or at the periphery of the cities;
- It represents the result of the adverse politics in the past and the unfriendly laws regarding the environment.

The perspective from which the brownfields are viewed is also very important. They can raise the worry of those concerned of the environment condition, or a certain melancholy from the people that were employed in the companies that functioned in the past
in those fields. Another perspective from which the brownfields are viewed can be an economic one, seeing the potential of the properties, and therefore it was opted for the reconversion and re-usage of those areas (Davis, 2002).

The reconversion of the industrial areas is a process that has appeared as a solution to reorganize the areas that once were occupied by industry and implied the destination change in the favor of commercial and residential projects. This process raised the interest of the professionals from more fields of study (Geography, Architecture, Urbanism, Sociology, History), beginning with the 70s when the developed capitalist countries (USA, Great Britain, France, Germany, etc.) shifted from the Fordism to the post-Fordism, that represented the basis for the deindustrialization and the abandonment of the industrial areas. The solutions that were found in these countries were generally successful, the reconversion taking place in the context in which the entire economy evolved toward the tertiary sector. After the fall of the communist regime, urban entrepreneurial islands emerged in Romania, too, which represent sources of urban revitalization and regeneration, and a solution to the problems created by the deindustrialization (Popescu, 2000, Chelcea 2008).

2. AIM AND METHODOLOGY

The objectives of this paper are the identification, localization and representation of the main types of industrial landscapes from Timişoara city employing digital models and the analysis of the actual condition of the industrial landscapes, of the main types of reconversion and of the industrial areas of brownfield type.

In order to achieve the objectives of this study, the first undertaking was represented by the study of the professional literature. After that, for the identification of the industrial landscapes of this city, a study of the cadastral and topographical plans, the historical maps and the satellite images from various years was considered.

The second stage of the study resided in the field-work analysis of some industrial landscapes and brownfields from Timişoara, and recording their actual condition. Based on the field observation in conjunction with the GIS techniques, I have realized digital models that represent the cartographic support of this article.

The final stage referred to the processing of the data collected from the field-work and from the existed bibliography, as well as the analysis of the satellite images. Based on the information collected during the first stages, I have created a database that contain 70 factories and companies, founded in different periods of time and localized in 8 industrial areas of Timişoara city. This database was created using ArGIS programme, and thus the digital models that consist in maps of the evolution and transformation of the industrial landscapes were completed. After the cartographic materials were realised, the interpretation of data and of the cartographic fund highlighted the transformation of the industrial landscapes in time, and especially, the changes produced within the industrial areas along with the deindustrialisation during the post-communist period. Then, I determined the main types of reconversion, taking into account the actual condition of the abandoned fields (of brownfield type).
3. TERRITORY OF STUDY

The territory studied in this research is represented by the area of Timișoara city that has known in time an intense and varied development of industry, being one of the first cities of Romania that has asserted itself in the industrialisation process (Popa, 2007; Anuța, Muțulescu, 2012).

Traditionally, the industry of Timișoara city was localized mainly in two very well individualized areas: Fabric district and Iosefin area, where the largest factories in Timișoara were located. The localization of the industrial units were conditioned both by the vacant fields that the city administration had available and the transportation routes, being known that the level of accessibility is one of the most important factors in the analysis of the localization of an industrial unit. The great advantage of localising the factories in Iosefin areas was the Bega Canal (navigable since 1732), and also the railway between Szeged – Timişoara that was inaugurated in 1857. The industry has begun to disperse on the entire surface of Timisoara city in time and along with the development of new ways and means of transport.

The main stages of the industrialization process in Timisoara are:

- **The Habsburg (1716-1867) and austro-hungarian (1867-1918) administration**: represents the start period of the industrial development in Timisoara. During this period were founded several factories: Beer Factory (1718), Cigarette Factory (1846), First Alcohol Factory and Refinery (1869), Shoe Factory „Turul”, Wool Factory ILSA etc.;
- **The interbellum (1918-1944)**: represents a stage characterized by political changes and the development of the city industry, new factories being developed: Battery Factory „Dura” (1920), Electrobanat (ELBA – 1921), Shoe Factory „Guban” (1937) etc.
- **The communist period (1944-1989)**: represents an industrial acceleration period that produced the migration of labor force from rural to urban settlements. The number of inhabitants is growing rapidly and also a lot of spatial changes are present. Also, new industrial platforms are opened (Industrial Platform Freidorf, Buziaș etc.) and new industrial units (AEM, UMT, Spumotim, Electrotimiș, Electromotor etc.).
- **The post-communism period (after 1989)**: this period is characterized by a deep restructuring process of the country’s economy, dominated by the transition from centralized (planned) economy to market economy. The majority of factories are privatized, relocated (from city center to peripheral areas) or abandoned. For some abandoned industrial landscapes (brownfields), a reconversion process has started.
4. DISCUSSIONS AND RESULTS

After the processing and the analysis of the data obtained on the field-work, I have remarked that half of the industrial units either have changed their destination, and become commercial, residential or services areas, or become abandoned areas, while the other half maintained its industrial function (Figure 2a). Nevertheless it must be specified that the surface of the areas where industrial activities are still present is still larger than the surface or the abandoned areas or of those that are in the process of functional reconversion (Figure 2b). Thereby, if the reconversion process has transformed 22% of the total industrial units, the total surface of these units represent only 8% of the total industrial landscape. It is still alarming that the dimension of the brownfields is very large (35% of the total industrial landscape). Concerning these areas, no measures were undertaken, and the negative effects over the environment and the society are still felt.
In an analysis on the timescale we have remarked that the most companies were founded in the communist period, when the industrialization process was forced and imposed from the central government. Thereby, from the total of 70 industrial units that were included in the hereby study, 30 were founded in the communist period, 18 in the pre-war period, 15 in the inter-war period, and 9 in the post-communist period (Figure 3). At present, the majority of the industrial units that were founded in the past suffered transformations, with the exception of those that sprung in the post-communist period, still continue to maintain their industrial function. Some of these multinational companies that have emerged lately were placed on the location of old companies from the industrial platform that were inaugurated in the communist period (Ex. Continental company on the UMT platform, Pădurea Verde industrial area).

In each industrial area, except the central area, there is at least one functional industrial unit (Figure 4). The disappearance of the industry from the central area of Timișoara city is due to both the deindustrialization and reconversion processes and the relocation processes. Thereby, some industrial units have been moved from the central part of the city to the periphery (ex. Modatim was relocated from 700 Market area to Calea Șagului area) where there is more space for the horizontal development, while the territory from the central area can be capitalized in other ways.
Consequently, the most processes of reconversion are found in the central areas, where the industrial areas have been transformed in commercial, service and residential areas, respecting in this way the general trend that characterizes the modern cities.

Brownfields still cover large areas of the within incorporated areas of the city, having a share of 28% from the total industrial units that number a total of 2.1 square km. The knowledge of this type of landscape may have a special importance in the future urban development of Timisoara city. The reconversion of the industrial-urban landscape or the rehabilitation of the abandoned industrial units can provide major economic, social and environment benefits. There are several types of brownfields transformation, according to the architectural and landscape changes that are produced:

- Total transformation, that implies the demolition of the industrial units;
- Partial transformation, that implies the keeping of some buildings of major importance;
- The rehabilitation of the industrial buildings, with or without the change of the functional profile.

From the total of 70 industrial units, 25 of them have suffered significant transformations according to the above categories. In many cases, in the context of permissive laws and of almost nonexistent input of the local community towards such transformations, it was called for the total transformation and the demolition of the industrial units. In their places, the most frequent solution chosen was the functional
reconversion (Figure 5). Therefore, in 36% of the cases in which industrial landscape was transformed, it was opted for the demolishing of the old industrial units, and in most cases a reconversion toward services, commercial and residential areas was brought about.

Fig. 5. Transformations in industrial landscapes in Timisoara

One eloquent example of total transformation of a brownfield is represented by the reconversion of the former “Fructus” factory from the central area of the city that was abandoned after the year 2000. Afterwards, the property was purchased, the buildings were demolished, then the place was cleaned and transformed in mixed functionality areas – residential and services (see figure 6). The same thing happened in two other cases of industrial units from the central area of the city: the Bread Factory and the Milk Processing Plant, which have been replaced by new commercial buildings.

At present, a similar process occurs in the context of the Industria Lânii (Wool Industry) company (ILSA) where the old building was demolished, and on the emptied field started the construction work for a residential compound named “The New Timişoara.” Although the project should have been finished until now, only a part was accomplished, and the rest of the field is in danger to remain at the brownfield level.

From the category of the partial transformation, I have identified two industrial units that are in the reconversion process, where only some buildings with architectural value were preserved: Stockings factory and communal Slaughter-house. In the first case, the reconversion is made towards the commercial sector, maintaining the old building body that was declared a historical monument. A similar case is also the communal Slaughter-house where it is intended the construction of a commercial centre. The architects proposed the integration of the heritage buildings into the new commercial areas.

From the last category, the one in which the former brownfields were completely rehabilitated, the most eloquent examples are those in which large multinational companies have been placed on the industrial platforms of the city in the post-communist period. These companies modernized the old industrial halls and buildings of the former companies continuing hereby the industrial activities in the old facilities. One example in this case is the Comtim company from Freidorf area. After a period in which the old industrial units were in decline and abandoned, the new owner rehabilitated the old industrial compound making it functional again. Another example of complete rehabilitation belongs to the Optics Factory from Buziaş industrial area. In this case, it was a functional reconversion in which the old industrial unit was rehabilitated and transformed in office area.
Fig. 6. *Transformation types in industrial landscapes of Timisoara*

a. total transformation – Fructus, past and present; b. partial transformation – Sock Factory conversion into commercial spaces; c. building rehabilitation – Optica Factory converted into services; d. brownfield, no actions – Solventul

(Sources: www.flickr.com (Szekely, 2005); maps.google.com; wikimapia.com; opiniatimisoarei.ro)

Although the reconversion processes have started to be more intense lately, the number of brownfields that are not under any undertaking is still very large (20 brownfields) being spread in the whole city. Most of these areas are still localized in the old industrial areas that are situated close to the city centre (the central industrial area, Iosefin industrial area, Fabric industrial area). The tendency of moving the industry toward the periphery of the cities in the last decades has left behind even in Timișoara many of these abandoned areas that are in a continual process of degradation.

**CONCLUSION**

After the study was carried on, it was highlighted the actual situation of the industrial landscapes from Timișoara, as well as the importance of the reconversion undertakings over the areas of brownfields type. These areas that come after the deindustrialization processes still cover a very large surface from the total of the industrial landscape (35%), and number 20 brownfields. The only processes that can change the fate of these areas are the functional reconversion and the reintegration in the industrial sector. Concerning the areas located in the central area, the best process would be the functional reconversion.

The reconversion processes have transformed only a reduced number of industrial units up until now, occupying only a very small area (8% of the total industrial landscape). The intensification of this process and the decommission of these areas would bring benefits both to the environment, that would not be affected any longer by the pollution from the contaminated areas, and to the social and economic environment, because these fields could be used by the community (new workplaces, residential areas, green area, etc.).

**Acknowledgment**

This work has been supported from the strategic grant POSDRU/159/1.5/S/133391, Project “Doctoral and Post-doctoral programs of excellence for highly qualified human
resources training for research in the field of Life sciences, Environment and Earth Science” cofinanced by the European Social Fund within the Sectorial Operational Program Human Resources Development 2007 – 2013

REFERENCES

Ancuța, C., Mutulescu, C., (2012), Aspects considering the evaluation of urban risk. Case study Ḟ Timișoara (Romania). In Recent Researches in Environmental Science and Landscaping proceedings of the 5th WSEAS international conference, University of Algrave, Faro, Portugal, P. 186-192.


Chelcea, L. (2008), Bucureștiul postindustrial, Polirom Publisher, București


Page, G.W., Berger, R.S. (2005), Characteristics and land use of contaminated brownfield properties in voluntary cleanup agreement programs, Land Use Policy, 23, pp. 551–559.


Web

* maps.google.com, accesat în data de 03.04.2014
* www.opiniatimisoarei.ro, accesat în data 03.04.2014
* www.flickr.com (Attila Székely, 2005), accesat în data 03.04.2014