Urban Regeneration through Industrial Restructuring of Brownfields in the Local Economies of Post Communist Countries. Case Study: Romania

INTRODUCTION

Industry is an activity that supports current consumption patterns, by providing significant quantities of products and energy for the use of population as well as for other industries *(Edelbutte, 2009).* The concentration of different forms of capital in the current urban settlements is due to existing industrial activities that have polarized the financial, human and technological resources *(lanos, 2004).*

Nowadays, industrial development has led to some undeniable advantages, by contributing to overcome major obstacles in the evolution of human society (*Andrusz et al., 1996*). Thus, the diversification of the resources used by current society, the speed up of the accomplishments regarding human facilities, the eradication of certain diseases and the significant improvement of living conditions are among the direct gains brought by industrial development (*Powe and Wills, 1998*).

At the same time, industrial activities generate persistent regional disparities (such as unemployment, concentration of population and of built spaces, immigration, social imbalances or gradual disappearance of the natural areas) that favors the proliferation of unwanted events (such as poverty, crime, monopoly, social segregation, environmental quality degradation, overexploitation of resources, chaotic sprawl of built surfaces, reduction of the oxygenated surfaces) (*loja, 2008*).

All these factors call for promoting new directions for the efficient exploitation of financial, social, physical and natural capital, especially because of the fact that industrial activities depend on the resources that can be found next to their habitat (*Popescu, 2000*).

The consequence of this phenomenon is the emergence in the nearby areas of the industrial units providing resources and / or in the receptive areas of environmental externalities of the so-called 'suffering areas', where there is an obvious loss of vitality, poor investments and increasing ecological, social and economic problems which have an expansion tendency (*Antrop, 2005*).

Regarding those problems caused by industrial activities, both in the operating phase, and afterwards, we must not forget about the contaminated lands. 68% of the contaminated lands from within the European Union are industrial ones and the largest share of units comes from chemical and petrochemical industry, as well as from metallurgy and machine building. From all these contaminated lands, barely 32% are being remediated which stresses the idea of taking them into consideration while setting up public policies (*EEA*, 2007).

Destructured industrial areas may have the following evolution:

- reactivation by renovating the existing facilities (like maintaining the initial on-site activity with possible technological upgrades);
- abandonment, with or without protecting measures;
- structural reconversion (keeping an industrial profile with a rearrangement of the physical capital);
- *functional and/or structural reconversion* (change of function, with or without initial physical and historical capital preservation)

Industrial destructured area remediation is an extremely complicated problem, because it requires a significant mobilization of resources aimed towards a future alternative development area (*Gheran, 2011*), often including removal or improvement of historical problems (*Popescu, 2000; Ianos, 2004*).

Removal of persistent historical problems (contamination, insecurity, territorial fragmentation, etc.) (*Candea et al., 2006*) represents a vital condition for any approach to preserving industrial space (*Healey, 1995*). The management of the industrial brownfields, which can be done in situ (thermal, biological or chemical treatments) or ex situ (by excavating contaminated material), involves significant environmental costs that are difficult to bear during the post-use phase (*Sileam, 2011; Witek, 2011*).

The conservation of industrial spaces may involve keeping the total (including equipment) or partial (buildings, equipments or other components of the production structure) 'amount' of physical capital. From a functional point of view, the industrial function frequently disappears, giving way to commercial activities, services, specialized residential or green spaces (*Popescu, 2000*).

ROMANIA - INDUSTRY CHANGES

Romania has a total surface of 238,391 km², being characterized by an uniform distribution of the relief forms (35% mountains, 35% hills and plateaus and 30% planes), fact that determines a variety among the economical activities (*Rey et al., 2006*). The existing natural resources with a great potential usage are oil, natural gases, coal, the construction rocks, nonferrous ore and water. The Romanian population reaches 21.5 million people, the average density being around 93 inhabitants on km². The amount of population working in the industrial sector represents 28.4% from the total population. The GDP value is 11,600 USD per capita and the human development indicator has a value of 0.813 (*Popescu, 2000*).

The industrial activities represent 27.6% of the GDP, being the main activity, beside the tertiary activities, which sustains the national economy. The most important active industrial branches are in the field of energy, mining, ferrous and nonferrous metallurgy, machine manufacturing, and supplies (*Rey et al., 2006*).

These industries' shares varied along the time. The industrial activities development in Romania started in the second half of the 19th century, when this development was dissipated and dependent on the existing territorial resources. After 1918, the industrial activities are being concentrated in a selective way in the existing industrial centers (Prahova Valley, Resita, Turda, Piatra Neamt, Cisnadie, Friza de Jos, Ferdinand, Hunedoara).

The massive industrialization started after 1945, when under the Soviet Union's influence the heavy industry was developed, being considered the key of a strong society progress. At the beginning the industrial activities were developed at a regional level (1945 – 1969) and then at a district level (1968 – 1989) when the industry was diversified. The location of the industrial sites was made according with the ten Leninist principles, mainly following the natural resources availability and proximity, also a well-balanced territorial development. After 1968 the spatial dispersion is accompanied by a significant diversification of the economical activities focused on the satisfaction of the Romanian people and the CAER countries. The old industrial activities are significantly extended, followed by the appearance of the so called "industrial giants" in cities such as Galati, Baia Mare, Hunedoara, Slatina, Ramnicu Valcea etc.

After the Revolution from December 1989 and the collapse of the communist regime, Romania has focused towards the capitalist economy. This fact led to the idea that the industrial sites, built during the communist regime were energy-intensive, unprofitable and hard to be managed by the Romanian Government. On the ways of implementing the capitalist system, the Romanian Government had to reform the industrial system by passing it from the public domain towards the private domain, except most of the units from the energetic branch.

After the privatization process many industrial units (especially the ones form the chemical and engineering domain) were closed, leaving behind abandoned sites represented by buildings, industrial plants and/or industrial waste deposits (especially the chemical industry

units, the engineering units but also the coal and nonferrous or the extraction sites). Most of these sites were abolished and turned into deposits or commercial places, and other are continuing to include in their sites areas that are about to be reconverted (especially brownfields) (*Rey et al., 2006*).

Other parts of the industrial platforms have been fragmented. Only the ones which succeeded to adapt to the market economy resisted. In many cases, a mix of territories with various functions (old industrial sites, new industrial sites, commercial sites, deposits, residential sites, green fields) was generated.

Less than 20% of these industrial sites continued their activities, even if in many cases the activities were limited (especially in the energetic, metallurgy and petrochemical units). Remarkable examples in this way are MITTAL STEEL Galati (ferrous metallurgy), Aurul Baia Mare (nonferrous metallurgy), Oltchim Ramnicu Valcea (chemical industry), the refineries from Ploiesti Municipality (petrochemistry), ALRO Slatina (aluminum industry), the nuclear plant from Cernavoda and the power-stations from Turceni, Rogojelu, Mintia Deva and Isalnita (*Patroescu et al., 2006*).

DEINDUSTRIALIZATION EFECTS

The deindustrialization process that took place after 1990 might be perceived as an environmental friendly process because during the industrial period the old technologies which represented the industrial units' equipment consisted in important polluting emissions. In addition, the biggest industrial platforms were large territory consumers and resource consumers (electricity, water, raw materials) and they were an important industrial waste generator.

At once when the activities within these industrial platforms were stopped, the polluting emissions and the industrial waste production were stopped too, but the environmental issues didn't disappear. Brownfields continued to generate significant problems on the former industrial areas. In Romania, from the 40,000 brownfields, with a total area of 75,000 ha, 20% are represented by territories affected by industrial waste, 12% by extraction activities, 7% by the oil extraction and processing and 5% by the processing industry (EEA, 2007).

The main issues are determined by the extractive waste dumps, some of them being composed of chemical substances that are very aggressive with the environment (heavy metals, radioactive compounds, VOC etc). Some of these extractive mining landfills, which are not being stabilized, generate great issues around them especially during a more important atmospheric dynamics. Their concentration in the Carpathians and in the Subcarpathians area (coal fields from Motru, Rovinari, Petrosani, Apuseni, Baia Mare), where the slopes mobility is very high makes their stabilization very difficult. That's the reason why the impact of these extractive waste dumps is observed at a transboundary level (for instance the ecological accident from Baia Mare).

The Romanian legislation alignment to the European legislation imposed the necessity of elaborating some regulations which referred to the risks' evaluation that these sites represent for the human and ecosystem components, imposing the assumption of responsibilities in the investigation and evaluation process for brownfields.

Good results regarding mining waste landfill management and stabilization using vegetation were recorded at the extractive waste landfills from the coal filed of Oltenia from the Oltenia Subcarpathians (*Acacia* plantations), on the slag and ash landfills from Sanpetru – Brasov (center of the country) and it is considered that this method can be applied for the cooper flotation dumps from Moldova Noua (south – west of the country) which generated transboundary impacts regarding the particulate matter, affecting territories from Serbia (*ENERGOHALST*, 2009).

Beside environmental issues generated by the abandoned industrial platforms, these have a strong echo in the Romanian social environment (Popescu, 2009). This echo was strongly felt in the '90 when after the privatization and the restructuring that took place, an important amount of workers lost their jobs. In most of these cases the redundant population from the industrial units, because of the age and of the lack of professional knowledge, couldn't reintegrate in the economical sectors that were new in Romania. The situation had a great impact over the poverty issues at national scale. After this phenomenon, the workers' residential districts, related with big industrial platforms or extractive fields, turned very fast into ghettos where the social issues and the insecurity ones represented various risk factors (*Liiceanu et al., 2004*).

The unemployment rate has gradually increased in the '90 as an effect of the industrial collapse associated with the agricultural system fall. In 2000 the unemployment rate in Romania reached 10.5% (1,007,131 persons) from which the unemployment rate among females was 10.1% (471,608 persons) and among males was 10.7% (535,523 persons) (Rey et al., 2006). The lack of job opportunities and the low wage level has generated a process that is still active in Romania and that is the population's emigration towards Western Europe countries and across the Atlantic Ocean, on the American continent, especially in Canada.

The unemployment rate and the social problems led to an increase of the criminality rate at a national level, increased values being recorded also in the '90 with a maximum of 101,705 persons convicted in 1995 (*Liiceanu et al., 2004*). The crime percentage decreased after 2000 because of the emigration process. Among the children coming from these poor environments, the country faces problems related with school dropout and home dropout.

Besides the social impact of the industrial units' cancellation, there are also impacts over the national economy. First of all the finished product rate has decreased, generating the increase of imports. On the other hand the raw material export has increased, because in Romania there are no longer specialized units to process them. They are generating a financial imbalance because the price paid for an exported raw material is lower than the price paid on the imported finished product, processed from the raw materials that Romania has exported at the beginning.

Poverty decreases the consumption power and the lack of a stable and constant consumption society slows or stops the capitalist progress of the country.

As it was mentioned before, the social problems within the former workers' residential districts affects the business environment, especially the real estate business. The price of the land nearby these neighborhoods is cheap, automatically being attractive for developers. In this way, incompatible activities that generate conflict have been developed in these areas (commercial places, new luxury residential places, office buildings). In this way, a phenomenon met especially in Bucharest, is the fact that the extension of the city's territory includes these poor and social unbalanced neighborhoods inside the city. This situation is hard and expensive to be managed by the authorities because besides the investments that have to be made to increase the living standards of this poor population, they have to invest in keeping a secure environment for the functions around these neighborhoods.

The deindustrialization of Romania and the privatization of the industrial units drew a chain reaction with echoes over the environment and over the social environment, situation which today represents a consumption of financial funds because it has to be solved. Through efficient function reconversion or industrial reconversion, the Government can provide jobs for the people and decrease the impacts on the environment.

PERSPECTIVES

Industrial reconversion is part of a long planning process, developed mostly at a national level and can focus upon larger industrial areas, as well as upon sites too *(Edelbutte,2009)*. This has become a crucial subject when the number of closed businesses had increased and our country truly adopted the concept of sustainable development implementation.

The private sector is the main actor of reconversion, coordinated and influenced by the public sector. In terms of public funding, these come from trade policies of state aid, tax incentives and crisis cartels. In the documents focusing on regional development, the areas specific to the reconversion process can be classified into three state aid schemes: deprived areas involving the use of fiscal instruments, industrial parks providing tax breaks to specialised companies inside industrial parks such as exemption from pay taxes, deductions from income tax, VAT reductions and industrial reconversion areas with an economic potential growth (*European Urban Knowledge Network, 2009*).

At national level, several institutions are involved in the industrial reconversion: the Ministry of the Environment and Forests, the Ministry of Tourism and Regional Development, the Ministry of Economy, Trade and Business Environment, the Ministry of Finance) and other state bodies such as the National Environmental Protection Agency, the Environmental Fund Administration, the Romanian Agency for Sustainable Development of Industrial Areas, the Office of State Ownership and Privatization in Industry.

At local level, all local authorities must act quickly because of the social pressures related to rising unemployment and economic problems by conceiving a problem-solving strategy (*Gheran, 2011*). For Romania, the local authorities involved are the City Hall, the City Council, the Environment Guard, the Environmental Protection Agency, the Chamber of Commerce and Industry. However, the uncertain legal context does not provide a clear image of each authority's role in the process of reconversion (*Rey et al. 2006*).

Theoretically, research institutes and universities operating in this area should be involved in this reconversion process, in order not to limit the decisions regarding industrial sites to political options or to strict economic advantages.

The citiziens are also involved in this process and they are being consulted through public meetings of awareness, even if most of the time these things happen only in a formal way.Also, we must not forget the non-governmental organizations that may either present a public opinion regarding a certain activity included in the reconversion process or they can persuade the citizens about certain actions promoted through successful lobbying campaigns.

All these actors have managed to maintain part of the industrial buildings with historical value. Most industrial buildings and related facilities were fully damaged and there were recovered all recyclable resources. Many of these equipments could have been used as urban or historical landmarks, or even better turistic ones.

In Bucharest, for example, most of the industrial units built during the communist period or earlier, were abandoned, thus stimulating their degradation. Assan's Mill (*fig.1*), an industrial heritage monument from 19th century is currently an industrial site that raises serious health and safety issues. Instead, areas such as the Glucose Factory (*fig.2*) or Poligrafia Romana (*fig.3*) have been successful reconverted, maintaining themselves very well being very well integrated in the local architectural assembley in the original plan of the area.

CASE STUDY – CAMPINA MUNICIPALITY

Campina Municipality is a medium-sized town from Romania, placed in Prahova County which during the interwar period was defined as an industrial town, mainly focused on the oil industry. The town's industry was important even in the Second World War during Romania's alliance with Germany, providing fuel for German war machines. At Campina, it was build the

first modern refinery from Europe, "The Romanian Star" Refinery (Steaua Romana), and today is the oldest refinery from Europe. The presence of this refinery drew other industrial activities related with the oil processing.



Fig. 1 – Assan's Mill – National Patrimonial Industrial Site in an advanced degradation stage





Fig 2 - Poligrafia Romana – Reconversion from industrial towards commercial by keeping the outdoor architecture

Fig. 3 – Glucose Factory – reconversion from industrial towards residential by keeping the structure of the building

After 1989 the industrial activity within the town has decreased as it happened all over the country, the refinery and the other industrial activities were sold to private investors. In present most of them are about to be closed. Unlike the other industrial towns from Romania, in Campina Municipality the reconversion from the industrial sites into commercial or residential sites is not an option because the demographic potential is not that high.

For Campina's industrial site it is more appropriate to use the integral patrimonial conservation model. The main conservation unit, which has to be integrated in the national tourism circuit is the "Romanian Star" Refinery where on its entire surface of 49.9 ha it can be arranged an industrial museum that can capture the refinery's entire history from the year of the opening (1895) until now. "Romanian Star" Refinery can be the start point, the finish or it can be integrated in an industrial circuit in the town where there can be included other industrial units specialized in oil processing or oil extraction engineering. This circuit has to provide visits to the oil equipment factory, former called "Sterom", now called Cameron, to the derrick electric engines service, I.R.U.E., to the oil extraction equipment factory NEPTUN S.A., to the Oil and

Natural Gas Research Institute (well known all over the world), to the command center of the oil derrick camp, "Schela Campina", and also to the oil weathers for observing the impact over the environment of the oil industry (*fig 4*). For the creation of this industrial circuit it is not necessary to preserve all the activities that were mentioned, but a local regulation can require that no matter what destination the former industrial platforms would get, the architecture and the equipment should be preserved.

This scenario is feasible even from an economical point of view, because to reconvert the industrial sites into commercial or residential sites, decontamination processes have to be made with bigger costs. If all these industrial buildings were conserved, the costs would be lower and the circuit would provide more jobs as if the industrial sites were reconverted into commercial ones. Also the circuit would grow the town's attractiveness at a national and international level.



Fig. 4 - Proposed Industrial Circuit in Campina Municipality

This reconversion model is not an ideal one or one applicable to all industrial platforms from Romania, but for a 35,000 persons' town whose extension is limited by the terrain fragmentation and who lies in the polarizing area of Bucharest, this industrial platform management plan is the ideal one.

STUDY CASE- SUCEAVA MUNICIPALITY

In Suceava municipality, after 1990, the industrial activities have also experienced a drawback, during the transition to the market company. According to the decisions of local authorities, the economic profile of the city has changed and only certain industries based on exploitation of local resources and skilled labour have managed to withstand. The city tends to becoming a great commercial polarizing center for the north part of Moldova. The industrial site Burdujeni – Suceava Valley (one of three industrial sites of the city) undergoes a current process of reconversion and that is because once in situation of decline, the local authorities make sometimes hasty decisions regarding the development of the whole site, mostly unauthorized, thus leading to a segregation of incoherent functions.

The rush related to this segregation brings about matters problems concerning that affect the neighborhood, as well as long term problems concerning the implementation of certain new functions. Basically, the main strategy of the local authorities aims at creating attractive places to polarize people's full attention through providing spaces and features that were missing from the city's structure and that could have helped Burdujeni industrial site to overcome its problems through an aggresive branding (*Popescu, 2000; Primăria Municipiului Suceava, 1996*).

However, nobody takes into account the fact that the 40 years of industry (wooden industry, chemical industry, cellulose and paper industry, heavy industry or the electricity one) (*Lupchian, 2007*) have left their mark upon the city. It is not enough just to invest in a particular location for profit, it should also be considered to apply some guiding concepts (both economic and environmental ones) on the functional reconversion of an area, ultimately meant to help building a proper profitable development.

The best examples of overlooking this aspect are related on one side to the emergence of land degradation, on which efforts were made in building some business units, subsequently abandoned (ie. the land in the proximity of the former cellulose and paper company). Another example is putting together catering units next to the former towers of the Artificial Fibers Entity (fact proven to be harmful to the population) (*fig.5 and fig.6*).

In the case of the industrial site of Suceava, a heritage conservation might not be the best option, but the solution would be a typical industrial reconversion, supported by an improvement of the economic and legal framework. Thus, a better management of the land surface classification conditions – as a result from the demolition of former companies – would lead to receiveing funding from the Regional Operational Plans for a complete decontamination and they would be used for a variety of functions (*Sileam, 2011*). The ideal one would be focusing upon the development of buildings for offices and related services needed for the activity on the industrial site. From an economic point of view, stepping out of the economic crisis could give investors the opportunity of new functions in the area.

Locally, the reconversion strategy mainly aims to better management of existing industrial activities, as well as creating new ones. The ideal solution for attracting new investments sets upon the circumstances of a technological park that could also lead to the creation of an exhibition center using the existing structures.

Regarding the preserved establishments, they will be replaced with activities similar to the existing ones prior to closing the unit, so this process will involve both new investors and local authorities. In this case it would be ideal a public-private partnership. The final result of organizing industrial activities from the site would emerge into the coherence of activities and better collaboration between units, also through the industrial symbiosis (considered as waste reuse of elements in a particular unit of another industrial process).

None of the current commercial activities can be stopped because of the large investments. Therefore, it will be taken into consideration a cooperation between the three commerce centers, opportunity leading to the removal of redundant activities and complementary services.

From the social perspective this scenario would offer significant improvements in terms of creating new jobs, creating a social cohesion in the area, as well as solving certain issues related to environmental pollution and risks. From the perspective of creating new jobs, the site could provide them from the beginning of the reconversional process, as most of the time this is a long-term developed and complex process, involving a wide range of professional disciplines. Thus, the ideal scenario for the industrial site reconversion of Burdujeni would rely on an active political support that would later on create a platform between various stakeholders throughout the entire process. Such project requires not only the local government, the investors or the existing firms on the site, but also real estate professionals, urban planners, risk insurers, land reclamation experts, observers (from the evaluation of land, topography and cadastre) geotechnical engineers, lawyers.



Fig. 5 Industrial platform of Burdujeni – Suceava Municipality before 1990



Fig. 6 Industrial platform of Burdujeni – Suceava Municipality (present)

In the long-term, the allocation of new industrial site functions, as well as solving the existing problems could lead to improving the image of the entire city and focus upon the local government objective, which is transforming the city of Suceava in the main urban pole for the North East Region of Romania.

Conclusions

The industrial reconversion of a particular site is influenced by several key factors , depending on the type of the existing industry and on the local particularities. Choosing a type of urban function must be done explicitly before or immediately after the abandonment phase of the land, and after the assessment of the state of the contaminated area.

Industrial heritage conservation should be considered as an alternative option when it comes to planning the reconversion of the industrial areas. They could become not only museums of the past, but demonstration places of the territorial problems generated by industry in different stages.

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