



Methodological issues concerning the development of sustainable industrial parks

*Aspecte metodologice privind dezvoltarea durabilă
a parcurilor industriale*

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Abstract

Nowadays, in order to make a sustainable economic growth possible, especially within manufacturing industries, with auspicious effects concerning the standard of living and the employment rates, the governments should develop and implement projects and strategies, aiming the transition towards knowledge-based economy. The entities that need investments the most are the countries which are crossing a development process, usually facing difficulties in developing a high-performance industrial sector. Under these circumstances, industrial parks prove to be important tools in order to ensure the competitiveness of the national industry. However, the more and more frequent relocation of industrial companies within industrial parks, as a consequence of amplifying the urban areas' environmental regulations, is due to generate uncontrollable pollution centers, placed just nearby towns and cities, with highly destructive impact upon the environment. This article aims to describe and recommend several strategic options for developing sustainable industrial parks, focused on protecting the environment and promoting the "new economy's" principles. Among the strategic options recommended, some of them are highly innovative, such as environmental benchmarking or environmental leadership.

Keywords: *industrial parks, sustainable development, environment protection, environmental economics, environmental leaders, SME's development, pro-active environment strategies*

Rezumat

În zilele noastre, pentru o creștere economică durabilă cu efecte benefice în ceea ce privește nivelul de trai și rata de ocupare a forței de muncă, în special în industriile producătoare, guvernele ar trebui să implementeze și să dezvolte proiecte și strategii, care vizează tranziția către economia bazată pe cunoaștere. Entitățile care au nevoie de cele

mai multe investiții sunt țările care traversează un proces de dezvoltare, confruntându-se de obicei, cu dificultăți în dezvoltarea sectorului industrial de înaltă performanță. În aceste condiții, parcurile industriale se dovedesc a fi instrumente importante în asigurarea competitivității industriei naționale. Cu toate acestea, frecvența amplasare în apropierea orașelor a firmelor în cadrul parcurilor industriale, ca o consecință a reglementărilor de mediu privind „zonele urbane”, generează o incontrollabilă poluare, cu un impact extrem de distructiv asupra mediului. Acest articol își propune să descrie și să recomande mai multe opțiuni strategice pentru dezvoltarea durabilă a parcurilor industriale, axate pe protecția mediului și promovarea principiilor „noii economii”. Printre opțiunile strategice recomandate, unele dintre ele sunt extrem de inovatoare, cum ar fi analiza comparativă de mediu sau leadership-ul ecologic.

Cuvinte-cheie: parcuri industriale, dezvoltarea durabilă, protecția mediului, economie de mediu, liderii mediului, dezvoltarea IMM-urilor, strategii pro-active de mediu.

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Introduction

Generally, an industrial park may be assumed as an infrastructure facility with production, warehouse and office premises, usually located outside a city, on a large property and hosting representative offices of various business types, from large to small, being combined via an integrated solution for utility services and transport infrastructure. An industrial park is not the random selection of neighbouring enterprises looking for a united technical solution in their own facilities, but, rather, an organized facility with a single legal, technical and transport infrastructure receiving the support of various governmental bodies.

According to Romanian regulations, industrial parks represent geographically delimited areas, frame for developing economic and industrial activities, services, scientific research, technological activities and other collaborative processes, by receiving specific facilities, in order to enhance the employment rate and to develop the human and material resources in the region. Industrial parks also involve the development, by an Administrator, of business infrastructure, which will be made available to any interested economic agents, in order to perform their specific activities.

Nowadays, under the pressures of the “*new economy*”, the *knowledge based economy*, the mere development of an industrial park is not any more a key factor towards competitive advantage within certain industries. As big groups of industrial firms, the industrial parks are main polluters, which are being watched more and more carefully by different regulatory authorities. Under these circumstances, developing sustainable industrial parks is rather a necessity than a strategic option (Ilieș et al, 2008).

Within sustainable industrial parks, the companies, large or SME's, seek enhanced environmental, economic, and social performance through collaboration in managing environmental and resource issues. By working together, the members seek a collective benefit that is greater than the sum of individual benefits each company would realize by only optimizing its individual performance.

The main goal of a sustainable industrial park is to improve the economic performance for participating companies while minimizing their environmental impacts. Components of this approach include green design of park infrastructure and plants; cleaner production, pollution prevention, energy efficiency and inter-company partnerships. Also, a sustainable industrial park seeks benefits for neighboring communities to assure that the net impact of its development is positive and thus proving more interest for corporate social responsibility.

The entrepreneurs are also very attracted to the possibility of working in such environment that foster the development of clusters and creating a more favorable environment for survival and development of SME's.

Neither developing nor transforming already existing industrial parks in sustainable structures is an easy-achievable target. In order to succeed in such a challenge, the companies should develop integrated strategies, including one or many strategic options for ensuring a sustainable development.

Strategic options for ensuring a sustainable development within industrial parks

The strategic options for ensuring a sustainable development within industrial parks are an innovative concept, highly debated in political, economic and ecological meetings. However, there are very few approaches concerning this subject. Further, the paper will provide the theoretical and practical background for developing and implementing several strategic options within the already existing industrial parks in Romania, in order to convert them into sustainable structures and fostering the competitive advantage for SME's, large companies and research units that cooperate in such challenging environment.

a. Developing gradual improvement models

An initially model for converting the activities developed within industrial parks into sustainable industrial structures includes the following stages:

- Strengthening the environmental law regarding the economic activities developed within industrial parks

In this stage, it is recommended to harmonize the national environmental standards and regulations with the European Union ones and to apply them in a consistent manner, within all the regions of the country, whether they are urban or extra-urban areas. As well, it is necessary that the public authorities encourage the development of Greenfield industrial parks, instead of Brownfield investments and to stop the reconversion of former industrial platforms into industrial parks.

- Registering the economic agents which perform activities within the industrial parks

In this stage, the administrator of the industrial park will be requested by public authorities to provide a summary document containing the name and the main activities of each company located within the industrial park, along with a copy of the tenancy agreement between each company and the administrator of the industrial park.

- Calculating the impact of each company's activities upon the environment

In this stage, the District Environmental Agencies are requested to operate the monitoring process during one year time, in order to record, for each company's activity all the elements and incidents that may/did produce a negative impact upon the environment, resulting from the activities companies perform. Thus, the District Environmental Agencies are supposed to use as a referential the environmental indicators and the maximum allowable levels set by the national environmental regulations. Afterwards, the results might be synthesized in a matrix similar to Figure 1.

		<i>Economic Agent</i>			
		<i>S.C. 1</i>	<i>S.C. 2</i>	...	<i>S.C. j</i>
<i>Indexes</i>	<i>I. 1</i>	v_{11}	v_{12}	...	v_{1j}
	<i>I. 2</i>	v_{21}	v_{22}	...	v_{2j}
	<i>I. 3</i>	v_{31}	v_{32}	...	v_{3j}

	<i>I. i</i>	v_{i1}	v_{i2}	...	v_{ij}

Figure 1 Pollution levels matrix within industrial parks

where v_{ij} – the comparison between the I_j index belonging to the company j ($S.C.j$) with the national average maximum allowable level; this index equals 0 if the company level index is lower than the maximum allowable level j and equals 1 if the company level is index is upper than the maximum allowable level j .

- Developing an initial environment analysis

In this stage it is necessary to evaluate each company located within the industrial park taking into account the data provided by the District Environmental Agencies. The initial environmental analysis will be performed by using *the scoring method* and it will provide a full view on the degree of pollution resulting from economic activities of each company.

- Dividing the companies in three environmental performance categories

In this stage companies in the industrial park area will be divided into three categories of environmental performance, as follows:

- ✓ „A“ Category – companies with no negative environmental impact (score 0-1);

- ✓ „B“ Category – companies with a moderate negative environmental impact (score 1-5);
- ✓ „C“ Category – companies with strong negative environmental impact (score > 5).
- Defining recommendations for developing sustainable activities within the companies belonging to “B” and “C” categories

In this stage, the Administrator of the industrial park, supported by the public authorities, will issue a notice to inform companies falling under „B“ and „C“ environmental performance categories with regard to the settlement recommendations and the deadlines for re-evaluating their economic activity in terms of environmental protection and conservation.

- Monitoring the implementation of the recommendations provided in order to develop sustainable activities within industrial parks

In this stage, the Administrator will ask the companies falling under „B“ and „C“ environmental performance categories to provide a Gantt diagram of the performance of the environmental objectives set out by notification. Afterwards, the Administrator will evaluate and monitor the operational deployment of the diagram. If the companies will fail to fulfill the obligations they assumed until the deadline, the Administrator will proceed to cancel the tenancy contracts signed with the companies, without any notice or payment of compensation.

b. Environmental benchmarking

Another method for converting the activities developed within industrial parks into sustainable industrial structures refers to the *environmental benchmarking*.

Environmental benchmarking is a new science designed to conceptually identify and assess opportunities to enhance environmental performance, conserve energy, reduce waste, and develop sustainable economic activities not only within industrial parks but also within any economic activity.

The SME's sector is more and more involved with environment protection, with care for the needs of the community where it works and earns its income! The issues related to corporate social responsibility are more present in the agenda of the SME's leaders as a strong message that is addressed to different categories of stakeholders. Their activities and outputs influence to a large extent the environment assessments within the industrial park and their business models can become examples of good practices for the companies from other parts of the country.

Environmental benchmarking includes also several stages a company should overpass before becoming environmental friendly, as follows:

- Describe and develop performance metrics and indexes focused on areas of specific interest in order to allow the comparison across companies;

- Research industry practices and trends including collecting and analyzing quantitative and qualitative data on the policies, actions, successes, and failures of industry peers;
- Assess the overall performance of each of the companies included in the industrial park relative to the metrics and developing rankings to identify best in class;
- Provide a gap analysis to highlight companies' strengths and weaknesses relative to the environmental field;
- Provide targeted recommendations for cutting-edge projects, policies, and initiatives that allow companies to maximize operational efficiencies, improve environmental quality, and reduce operating costs.

c. Environmental leadership¹

Another method for converting the activities developed within industrial parks into sustainable industrial structures refers to the environmental leadership.

The leadership process within the companies located in industrial parks will become more and more complex. For example, part of the leadership processes within such structures may be focused on managing the human resources of the organization, another part of the leadership processes may be focused on managing organizational change, another part of the leadership processes may be focused on managing conflicts, and another part of the leadership processes may be focused on developing a viable vision due to preserve the natural environment (Diamond, 2006) in order to create a sustainable development-based approach at organizational level. The last category of leadership processes stated above is also known as *Environmental Leadership*.

The companies' leaders and managers have to take into account that the environment becomes an issue that can exert a huge influence over organization's activities and evolution, both directly and indirectly (Viluksela, 2007). In dealing with environmental aspects the leaders can easily discover that are implied not only rational arguments, but people tend to be more emotional involved (Graff, 2006). Under these circumstances, the leaders' role will be to value to the highest level, the potential of the resources that are available to him, with a particular emphasize on the human resources (Năstase, Țăpurică, & Tache, 2010).

New *Environmental Leadership* is much more than a trend in modern leadership, it is a necessity in the current economy, needed to solve conflicts and find acceptable and sustainable solutions to problems (Gordon & Berry, 2006). Moreover, *Environmental Leadership* is a new philosophy that may contribute to not only achieving compromises in complex situations, but also to creating a powerful way of working together towards new and sustainable solutions (Hunt, Auster, 2005).

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We present below the main factors that identify *Environmental Leadership* as a necessary strategic approach within contemporary organizations in general and within organizations operating within a sustainable industrial park, in particular:

- *Staying ahead of environmental regulations.* Harmonizing the strategies of the organizations with the environmental standards and rules proves to be a very expensive process for all the organizations that don't have environmental leaders. Having environmental leaders within the organization means higher opportunities to implement a pro-active attitude. Moreover, environmental leaders are supposed to manage the change process within the organization and are also supposed to reduce organizational inertia and the employees' resistance to change (Năstase, 2010).

- *Stakeholders' attitude towards environmental problems.* The main categories of stakeholders that present a high sensitivity concerning environmental issues are the customers and the employees. It is well-known that the customers belonging to the new economy are expecting the organizations to assume a responsible attitude concerning the environmental problems (Willard, 2006). The lack of certain strategic directions with regard to the diminution of the economic activities' impact on the natural environment is susceptible to become a main factor in market share and turnover collapse of the contemporary worldwide organizations.

- *Competitive pressures.* As the number of direct competitors on a market is continuously growing, *Environmental Leadership* may become a viable source of competitive advantage and a strategic approach in order to keep a competitive parity with their economic and investment capacity. The development of corporate social responsibility standards that some SME's already accepted can significantly contribute to a better market position due to a better market image!

- *Technical progress and innovation.* The development and implementation of "green technologies", the exploitation of non-conventional energy resources, and the international technologic and managerial know-how transfer, are main issues that reduce significantly the impact of economic activities on the environment, generating, at the same time, scale economies, reduction of technological expenses and last, but not least, the ecological costs' cutting-off.

Environmental leaders inspire a viable vision of the organizations as environmental sustainable, creating or maintaining green values throughout the new developed industrial parks. Such values include stewardship in regard to ecology, frugality and sufficiency in regard to resources, fairness and appropriateness in relation to society and accountability, participation, pro-activity and long-termism in regard to process.

Although the path to pursuing environmentalism as a competitive advantage is a rocky one, requiring time, effort, money, the rewards can do extend beyond the short-run negative impact on the bottom line. Ultimately, pro-active thinking environmental leadership will set a course for higher overall business performance.

d. Pro-active environmental strategies

The fourth method for converting the activities developed within industrial parks into sustainable industrial structures refers to the *development of pro-active environmental strategies*.

The premise of developing pro-active environmental strategies resides in the fact that organizations are highly recommended, especially those operating in high environmental impact economic sectors, to develop specific environmental - focused strategies, as main source of achieving a sustainable competitive advantage on the market.

Developing such strategic instruments is more and more important as long as the reactive environmental strategies tend to become counter-performing within a challenging, dynamic and equilibrated competitive environment, which better describes the knowledge-based society (Senge et al., 2006).

The main objective of a proactive environmental strategy is to obtain a sustainable competitive advantage, based both on the market image and on reducing investment costs incurred by application of the new standards and environmental regulations, both by large and SME's.

Developing and implementing environmental strategies, in a proactive manner, however, is an extremely difficult process, which involves not only environmental leaders, but also significant resources and a long-term strategy (Diamond, 2006).

The effective implementation of proactive environmental strategies required by knowledge based economy usually involves significant financial efforts. However, those efforts are supposed to be depreciated in a relatively short period of time. The costs incurred by most companies located within industrial parks are related, especially, to the technologies' compliance with the production methods regarded as "environmentally friendly" (Manoleli, 2006), that enable the ecological criteria for eco-labeling the products. Most affected companies are the ones operating in the steel industry and oil. From methodological point of view, the integration of proactive environmental strategies raises several issues of quantifying costs and benefits resulting from implementation of these strategic approaches.

While the costs of compliance with standards are applicable to activities and/or technologies which are currently used, being easier to quantify and having a lower time horizon, the benefits are much harder to quantify. However, the benefits of increased air quality and industrial pollution control within industrial parks could be eight times higher than the costs of compliance (Manoleli, 2006), even in the five sectors with the greatest implications: energy industry, mining, chemical and petrochemical, steel and construction industry.

Advantages of ensuring a sustainable development within industrial parks

Developing sustainable activities in general and sustainable industrial parks in particular, is due to provide several advantages, as follows:

- The reeducation of the risk associated with the environmental accidents and adverse consequences caused by them both to the nearby citizens and to the companies' budget;
- The removal of costs of provisional measures adopted to protect the environment;
- Enhancing the attractiveness of the industrial park for the companies using clean technologies, and enhancing, this way, the industrial park competitiveness;
- The reduction of the fines incurred by operators for their failure to comply with environmental standards;
- The upgrade of the existing infrastructure within industrial parks, with long-term positive effects on the performance and competitiveness of the companies located within the industrial park;
- The disappearance of some major pollution points on the map of the region covered by the industrial park;
- The pro-active strategic alignment to any legal constraints on environmental protection and conservation;
- The enhancement of labor productivity due to elimination of losses resulting from the technological processes as a result of implementing either Environmental Management Systems or Integrated Quality Management Systems.

These are the most obvious expressions of the advantages for developing sustainable industrial parks. It is assumed that there are many collateral benefits, depending on the region where the industrial park is being placed. However, there are as many disadvantages and obstacles in the process of developing sustainable industrial parks, which, if not considered, may lead to the immediate failure of any action adopted in this regard.

Conclusions

Sustainable industrial park development raises a variety of complex issues requiring the expertise of numerous disciplines. Support and integration of the work of these diverse professionals is central to the success of sustainable industrial parks development and operation.

Fortunately, all over the world researchers have started to develop powerful methods and tools to help public authorities or private entities implement a whole system approach in order to develop competitive structures onto the market. Thus, many of the concepts described in the paper are regarded as

innovative approaches, becoming standard practice in new industrial facility planning focused on pollution prevention. They also represent real challenges for the leaders from SME's companies as a source of fostering their competitive advantage and sending strong messages of high commitment to meet the expectations of their stakeholders in the new knowledge based economy.

The strategic management processes assigned to the development of sustainable industrial parks might be performed in the future by applying the principles of *environmental benchmarking*, *environmental leadership* or even *pro-active environmental strategies*, as worldwide sustainable industrial park management strategic options.

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