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**DEVELOPMENT AND CHANGES  
IN THE INDUSTRIAL FUNCTION OF A CITY  
WITH REFERENCE TO THE CONCEPTION  
OF SUSTAINABLE DEVELOPMENT  
(A STUDY CASE OF OPOLE)**

**Abstract:** The principal goal of the paper is to identify the influence of the industrial sphere on the development of and changes in a city, according to rules of sustainable development. The first part of the article is devoted to industrial objects and area which have existed for about 20 years and are characterized by huge changes. It is important to answer the questions: how changes in the case of an obsolete industrial area are related to social and environmental spheres, and what should be done in the case of a negative influence of the industrial sphere on the other two. Furthermore, it is important to identify the performance and actions which are taken by the local government in this context. The second part focuses on a part of Special Economic Zone in Opole as an example of a new industrial sphere and on identification of its influence on the social and environmental spheres. These two parts are compared with reference to the concept and rules of sustainable development. Moreover, it is important to mention actions within the urban policy, pertaining to both examples, and make recommendations in the case of occurrence of negative interactions with the social and environmental aspects.

**Key words:** sustainable development, urban policy, industrial function, city development

**JEL code:** R1

## **1. Introduction**

Industrial activity plays a significant role in the development and functioning of cities. Development of industry and localization of new enterprises positively influence the economic sphere through creation of new places of work. However,

functioning of companies does not always make a desirable or positive impact on the environment and interested parties. Nowadays, increasing global environmental problems are contained in the theory of sustainable development. This theory is broad and complicated in its interpretation but like Beatley and Manning point out, “there is a general sense that sustainability is a good thing and that being unsustainable is a bad thing” (Beatley, Manning, 1997, p. 3), but it is hard to circumscribe when it take place and that its desirable to move forward to achieve it. Moreover, the concept of sustainable development “does imply limits – not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities.” (Report..., p. 16). The concept of sustainable development ensure a framework for the integration of environment policies and development strategies (Report..., p. 38). Mentioned strategies affect mainly a global view. But it’s important to underline appreciable meaning of connection between local, regional and global policies. One of important element of local policy is spatial development (prevention of spatial conflicts, trends to spatial order). In this context, local activities in social, entrepreneurship and environmental aspect and particular actions of entity are crucial. The subject area of development and transformation of industry, in the light of the concept of sustainable development, is often raised, still considerations relating to it frequently turn out to focus on the very functioning of a given company itself, and not on results or effects of the development of an industrial area (Brzozowski, 2010, p. 119).

For the last 20 years the approach towards protection of environment, quality of life or corporate social responsibility has varied and evolved. Nowadays, more and more attention is paid to eliminating the unfavourable impact of enterprises on the surroundings in which they have come to function. These actions are undertaken both on the local level and from the position of companies; they also find their place in cities’ policies being realized. It needs underlining that they are not always suitable and compliant with the will of inhabitants whom they concern.

The author of this article concentrates on the process and conditions of the development of selected industrial areas of Opole, with the inclusion of the conception of sustainable development and its three aspects, that is economic, environmental and social. The analyzed areas differ from one another, the main element which influences the scale of their differentiation being localization and time of establishment. Accordingly, the following areas have been analyzed: the part of districts of Grotowice and Groszowice, which is called *Park Przemysłowy Metalchem* (Industrial Park Metalchem) (IPM) and the Northern Area which belongs to *Podstrefa Wałbrzyskiej Specjalnej Strefy Ekonomicznej* (Sub-Zone of Wałbrzych Special Economic Zone) (SWSEZ) situated within the borders of the city.

In order to carry out the analysis, the method of “desk research” was used and – in the case of the IPM – results of the report entitled *Analiza gospodarcza oraz przestrzenna wraz z elementami analizy społecznej części obrębów ewidencyjnych Groszowic i Grotowic w tym Parku Przemysłowego Metalchem* (An economic and spatial analysis

with elements of social analysis of parts of registered outskirts of Groszowice and Grotowice, including Industrial Park Metalchem<sup>1</sup>).

In compliance with the conception of sustainable development, the development of enterprises and industrial areas should be executed respecting natural environment and society, especially local community. While analyzing the functioning of companies based in the area of IPM and SWSEZ against the background of the conception of sustainable development, the author undertook to answer the following questions, at the same time taking into account the following aspects:

1. Economic:
  - What is the quality of the technical infrastructure found in the industrial area?
  - Do firms which are active in the area under analysis require modernizing/restructuring?
  - Do the firms undertake to cooperate in the sphere of R&D towards innovation?
2. Social:
  - Does the functioning of the firms exert a substantial influence on the surroundings (local community)?
  - Do the firms take up actions within the sphere of corporate social responsibility?
3. Environmental-spatial:
  - Does the functioning of the firms hold a considerable influence on the natural environment?
  - Are initiatives and actions undertaken to improve the state of environment?
  - Do spatial conflicts occur in consequence of the location of the companies?
  - What is the accessibility of the industrial area like as regards the communication system?

Moreover, an attempt was made at evaluating the policy run by the municipal authorities in the scope of actions taken in connection with the functioning of the industrial areas under analysis.

## **2. Transformations and the impact of sustainable development of the functioning of IPM (an industrial area functioning since the 1990s) on the social and environmental spheres**

The transformations going on in the area in which IPM was established have been connected with the development of metallurgical industry. The turn of the 1970s

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<sup>1</sup> The background of Analysis method were: PAPI- Paper and Pencil Interview which were made amongst entrepreneurs and residents of research area; direct interviews with users of the transport system of examined area; direct interviews with elected representatives of entrepreneurs; desk research of programming documents and planning, standard sources; quantitative analysis with exploiting indicators of the state, structure, dynamics; urban planning stocktaking. The questionnaire survey amongst residents (PAPI) was conducted on the group of 256 respondents. Every respondent staying in a direct contact with the pollster filled in the questionnaire counting 65 questions. The questionnaire survey amongst entrepreneurs (PAPI) was conducted on the group of 10 entity which is 50% of all entrepreneurs in IPM. Direct interviews with users of the transport system was conducted on the group of 52 persons.

and the 1980s saw the establishment of *Zakład Aparatury Chemicznej Metalchem* (Chemical Equipment Works ‘Metalchem’) (CEWM) in Opole, whose location was conditioned, among others, by the direct access to the Odra River and a relatively short distance from chemical plants. The construction of the complex lasted a few years, during which successive objects were being put into use and the infrastructure was being expanded, comprising facilities of electric power and gas engineering, rail transport and river navigation (a new port was built on the nearby Odra River). At the beginning of the 1990s, as a consequence of political changes, economic crisis and hard financial situation, the enterprise was transformed into a joint-stock company. At present, on the premises of the former CEWM there are about 20 private firms running their business activities. The enterprises which were in existence in 2013 there have formed *Stowarzyszenie Park Przemysłowy Metalchem*<sup>2</sup> (Association Industrial Park Metalchem). At present, the functioning of the firms is connected not only with the metallurgical branch, but also with transport, warehouse management and electro-mechanical industry (Table 1) (Szafranek *et al.*, 2014, p. 102–103). Thus, during the last 20 years the variety of businesses run by the firms has been extended greatly.

While analyzing the functioning of the firms associated within IPM as regards the economic aspect of sustainable development, the main focus was on examining the quality of the technical infrastructure existing in the industrial area, which has a substantial influence on competitiveness of firms and their functioning. The questionnaire-based survey conducted among the IPM entrepreneurs as part of the elaboration of the report submitted by Szafranek *et al.* (2014, p. 114) indicated a very low quality of the technical infrastructure, the road infrastructure in particular. This situation results from a great differentiation of ownership rights in the area, in which IPM is located and, accordingly, from the difficulty in carrying out modernization of the road infrastructure. In consequence, almost all the firms functioning within IPM have incurred expenses on repairs of the roads accessing their seats so as to be able to continue running their activities. All of the firms which took part in the study drew attention to the fact that of all the priority tasks which should be realized within the area of IPM those connected with the development and mod-

Table 1. Type of activity run by companies of IPM

Domain of business activity	Share of subjects in the overall number of IPM companies
Processing industry	30%
Construction industry	10%
Transport, warehouse management and communications	20%
Activity in the sphere of services and municipal management, social and individual activity and other	10%
Other activity	30%

Source: author’s own elaboration on the basis of a survey research and data from the Central Statistical Office.

<sup>2</sup> <http://www.krs-online.com.pl/stowarzyszenie-park-przemyslowy-metalchem-krs-905931.html>

ernization of the road infrastructure rank the highest and are the most pending (Szafranek *et al.*, 2014, p. 114).

Among the enterprises located in the area of IPM there are both those which were established in the 1990s and firms with a shorter time of business activity. They differ chiefly with the quality and the state of buildings, production halls, warehouses, as well as technologies which they make use of. It must be remarked that this element – to a large extent – influences the work conditions of the employed and has an indirect impact on the environment. The higher the degree of the thermal insulation of the buildings, the better the lighting of the production halls and the more modern technologies are in use, the less negative the impact on the surrounding environment is. Half of the examined firms acknowledged the necessity of modernization of the buildings and making new investments in their stocks of. Signaling such a need testifies to a poor state of the buildings which are at the disposal of the companies and the necessity of their bearing financial outlays connected with investments in stock of machines or production lines (Szafranek *et al.*, 2014, p. 109).

The next element which exerts an influence on the sustainable development are innovations which contribute to, among others, improvement of the state of environment and implementation of actions within Corporate Social Responsibility (CSR). The percentage of the IPM firms which participated in the study and acknowledged their own workers to be the major source of innovation was considerable and amounted to over 50%. As the main reason for not using external sources, they pointed to too much bureaucracy connected with applying for funds and the lack of partners for effective introduction of innovations (Szafranek *et al.*, 2014, p. 113).

The analysis of the IPM firms which explores the social aspect of sustainable development concentrated on determining their influence on the local community and examination whether the companies take actions within the framework of corporate social responsibility. In this place the notion of CSR (already mentioned earlier) needs explaining and so does its relation to the conception of sustainable development. CSR is a new concept that is characterized by a very intensive and dynamic development at present, the result of which is, among others, a lack of coherent terminology. CSR is also referred to as social relations of business or social involvement of business. It must be added that, in practice, there occur problems in implementing this conception by enterprises, the reason given being the lack of motivation in enterprises to implement it, as well as a lack of elaborated operations

Table 2. Barriers to implementation of innovations (according to the examined companies)

Barriers to the innovation process	Percentage of responses in all IPM subjects
Too much bureaucracy connected with acquisition of funds	70%
Lack of suitable R&D infrastructure in the firm	20%
Lack of partners to effectively introduce innovations	10%
We have not tried to implement them.	10%

Source: author's own elaboration on the basis of a questionnaire-based survey.

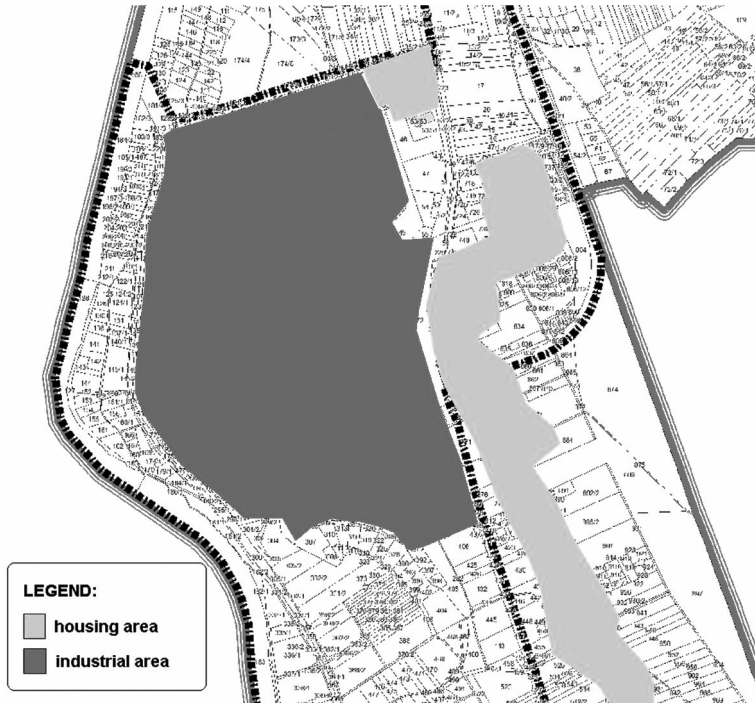


Fig. 1. The industrial zone – Industrial Park Metalchem and the housing zones  
 Source: author's own elaboration with the use of attachment to Resolution No. LI/764/13 of Opole City Council, day November 28th 2013.

of implementing the principle of CSR. However, despite the above-mentioned obstacles, this concept is still being developed.<sup>3</sup>

The conducted studies revealed a narrow extent of actions undertaken within CSR and talks held with randomly chosen representatives of the firms in the area of IPM activity pointed to a low awareness of problems connected with sustainable development of firms.

The conducted community interview with representatives of District Boards exposed the occurrence of certain negative effects of the activity run by IPM. Noxiousness of functioning of enterprises of heavy industry consists chiefly in generating noise through, among others, loading and unloading large-size cargo at nights. Moreover, the closeness of IPM and a housing area is felt acute primarily because of the arduous transport and incompatible network of access roads.

In the years when *Zakłady Aparatury Chemicznej* (Chemical Equipment Works) (CEW) were established, the intensity of traffic and the number of vehicles and systems of distribution were much smaller. The present road system has not been modernized (rebuilt) to a sufficient extent or adapted to the changing needs of transport: there are no bicycle paths, no transverse road connections to secure al-

<sup>3</sup> Ibidem, p. 258.



ternative access roads or eventual evacuation routes, the quality of the road surface is relatively poor and the level of pedestrians' security is low.

Therefore the close vicinity of the housing estate results in the occurrence of a series of negative phenomena connected with the functioning of the IPM enterprises. It should be underlined that the housing infrastructure in the analyzed area had existed before the industrial activity was begun there. Naturally, along with locating industrial companies, a "workers' housing estate" was also built, but it does not any longer perform the function it did 20 years ago and basically accommodates people who are not employed in IPM. Indeed, the location of the CEW was dependent – to the largest extent – on the nearness of the Odra River and the possibility of building a river port. Hence, closeness of the inhabited area was of secondary importance. At that time, the negative impact this had on the quality of the inhabitants' lives was not paid attention to, which after many years of functioning of firms and developing the industrial area has ended in a neglected space and a bad state of the road infrastructure. Also, the present quality of the space has for many years been influenced by the policy of the city's authorities, which has been passive, to say the least, with reference to the analyzed district.

Nowadays the district called Industrial District Metalchem is considered a problem area and unattractive as a place to live in. This situation is clearly reflected in prices of estates, which remain on the lowest level in comparison with those in the other districts of the city.

The analysis of the activity of the firms located within the area of IPM and their impact on the surroundings does not reveal any negative influence on the environment. However, heavy littering of the space near the works located in the area is an exception here. Even if, in consequence, there is no need to put forward initiatives and take action for improvement of the state of the air or soil in the nearest surroundings, the unaesthetic appearance of the space and uncared for area, in which the firms are located, result in a stronger sense of going unpunished for illegal dumping of waste. Another problem is also brought about by the old industrial infrastructure – buildings of the former works, which are falling apart. Furthermore, the studies revealed the occurrence of conflicts in this space, caused by the nearness of the industrial zone and that performing the residential function.

The communication accessibility of the industrial area from the perspective of both workers of the firms based in it and suppliers of goods was also analyzed. In this place it needs noting that the area of IPM is large, but the public communication runs solely along the main road (Oświęcimska Street). This results in the necessity of covering considerable distances by workers of the firms on foot in order to get to work. Because of the poor quality of inner roads and the lack of pavements, moving around poses a problem to those walking who cannot feel safe for the heavy vehicles moving along the roads at the same time. Unfortunately, for years the communication infrastructure has not been changed or expanded to improve access to the industrial area and decrease the intensity of road traffic along the main route.

### 3. A new industrial area in the city and its influence on the social and environmental aspects

The other area which was chosen subject to analysis functions within *Podstrefa Wałbrzyskiej Specjalnej Strefy Ekonomicznej w Opolu*<sup>4</sup> (Sub-Zone of Wałbrzych Special Economic Zone in Opole) (SWSEZ) and is located within the city's borders, in the vicinity of Partyzancka Street and the State Road 94 (a ring road bypassing Opole). The industrial area was organized in the former farming area which was transformed into one designed for developing technical-production, services, communications and transport infrastructure. The area has been equipped with a new road and technical infrastructure, and is located close to a ring road, which provides good communication access ([www.invest-park.com.pl](http://www.invest-park.com.pl), 15.07.2015). Despite the fact that the area of SWSEZ is not too large, yet due to its high investment attractiveness, a large number of investors have decided to be based there so far (The Pasta Food Company, Stegu sp. z o.o., IFM Ecolink, Art. Odlew, PZ Stelmach sp. z o.o., Polaris), (Załącznik nr 1 do Strategii, 2015).

Regarding the social aspect, it turns out that the activity of the firms located in the area belonging to WSEZ exerts very little influence on the quality of the inhabitants' lives. This fact results from the favorable location of the enterprises in the direct vicinity of a road system and well-prepared road infrastructure, as well as no direct presence of an inhabited residential area. There are mainly enterprises dealing in branches of food industry, electronics of jewelry, which are less noxious to the surroundings in comparison with heavy industry.

Due to the fact that the companies of WSEZ located their seats in the area mainly after 2010, they have at their disposal new office buildings, production halls and warehouses, which do not require restructuring or modernization. The neighborhood of the newly-organized Park of Science and Technology (PST) is an important factor which is deciding on locating companies in this area. Secondly PST have a positive influence on different forms of cooperation in the sphere of R&D in the companies based in WSEZ. Companies located on the WSEZ area, more and more often undertake the cooperation with local universities, a specially with Opole Technical University (OUT). One of the example is strong cooperation between IFM-ecolink and OTU. The scope of this particular cooperation is based on researches, practice and internships for students and researchers of the OTU. Moreover, it contain participation in scientific and innovative projects of researches and students. (<http://dwir.po.opole.pl...>). Another example is based on OUT and "POLARIS Poland" company cooperation (<http://naukawpolsce.pap.pl>). In this case, company which producing off-road vehicles, want to recruit engineering-technical scientists and working with them on official prototype test of their products and its development.

<sup>4</sup> *Wałbrzyska Specjalna Strefa Ekonomiczna* (Wałbrzych Special Economic Zone) (WSEZ) was established in 1997, in accordance with the Order of the Board of Ministers of 15.04.1997, Dz.U. nr 46, poz. 289–290 (Journal of Laws, No. 46, items 289–209), and the areas under analysis were included in the Zone in 2008 on the basis of Dz. U. nr 232, poz.1561 (Journal of Laws, No. 232, item 1561).



PST creates favorable conditions for the economic and scientific development of both Opole and the whole region, and its functioning concentrates chiefly on aiding the already existing and newly-proposed initiatives (<http://2.pnt.opole.pl/pnt/ct-menu-item-5>). Furthermore, PST creates a link between economic and new technologies which are available in the market and which lead to an effective development of the economy in the region.

As mentioned earlier, the business activities of the companies located within WSEZ only to a limited extent affect the lives of inhabitants living nearby, as the housing estates are separated with green areas and a well-planned system of access roads.

A positive aspect of the functioning of the enterprises grouped within SWSEZ is the opportunity to find employment there by inhabitants of the surrounding areas and the city: as far as the companies based there are concerned there have been 2.7 thousand workplaces created in them (Opole, Miasto chce..., PAP, 2015). The enterprises which have decided to develop their business activity in the Northern Sub-

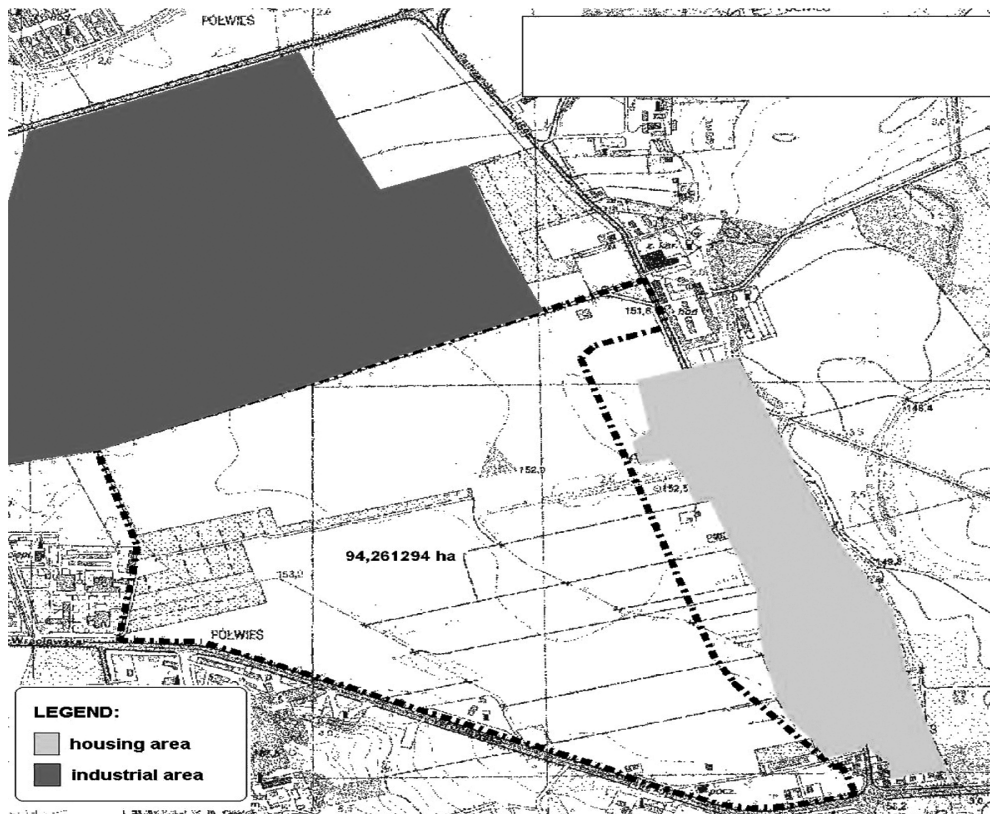


Fig. 2. Industrial zone – Sub-zone of Wałbrzych Special Industrial Zone in Opole and the housing areas

Source: author's own elaboration with the use of attachment to Resolution No. XXII/331/12 of Opole City Council, day January 26th 2012.

Zone of WSEZ are mainly companies with foreign capital. They have functioned for years and their headquarters are based outside Poland. The analysis of information available on websites of the companies and those run by other hosts does not imply that the firms implement initiatives relating to CSR. The lack of action in this sphere can result from low arduousness of the activity run by the companies or a low degree of corporate responsibility.

The analysis of the examined enterprises' activities reveals their insignificant impact on the environment. The objects newly-constructed by the firms are characterized by good insulation and modern installations, as well as by effective solutions regarding waste management. The location of the enterprises in the analyzed area does not provoke spatial conflicts, while communication accessibility of the industrial area is favorable. The closeness of the State Road 94, conveniently linking with Motorway A4, makes the area very attractive to potential investors.

In the studied theme is important to ask another one question: what the governance options are for the industrial park (SWSEZ). It has influence for the scope of functions, authority levels and budgets in the initial phase of the park's development (Little, 2014, p.5). The most important is the first question faced by a governing entity relates to its scope of function. The level of possible influence of self-government bodies on the development of SWSEZ is an important aspect. In this case, Invest Park Company in managing of all WSEZ, and which eleven self-government bodies have a 36.9% of shares, but a State Treasury altogether a 48.8% is holding shares what causes the limited power of the local government (<http://ssd.opolskie.pl...>). Nowadays, there is no connecting problems with this fact, but it could be in the future.

## 4. Conclusions

For the last 20 years Opole City's policy with reference to its industrial areas has brought along both positive initiatives and negative actions or a lack of any action at all. The last two options concern the industrial district Metalchem. The enterprises functioning in this area since the 1990s have at their disposal a neglected road infrastructure and the very area itself is characterized by low aesthetics of the space, which diminishes the attractiveness and competitiveness of the companies based there. Moreover, for years now the communication accessibility has not been improved, despite the intensifying transit traffic in the area. The river port which facilitates water transport and which used to be the decisive argument to locate Chemical Equipment Works there, does not play the role designed for it any longer nowadays. The development of the industrial area and intensification of the housing needs have caused present conflicts in the social dimension to require solving.

On the other hand, in the case of new industrial areas created after 2008, such conflicts have not come to appear yet. Nevertheless, with progressing expansion of industry and transformation of farming areas into zones designed for development of residential districts or running business activity, such a situation can predictably be occurring in the near future. Therefore, the policy of the city authorities should

take into account transformations of industrial areas in the long-term perspective in both economic, social and environmental aspects. The development of services and industry is beneficial to the social sphere, especially through creating new workplaces and decreasing the unemployment rate, yet a too expansive process of development can result in negative effects in the social and environmental aspects. It should be remembered that locating enterprises in the given area depends on the offered investment conditions: the higher the quality of the area, the greater the chances of locating pro-developmental investments there, which can substantially improve the level of life and stimulate the development of the region (Program rozwoju..., 2015). In view of the above, investments in the quality of infrastructure are of paramount importance as it is most vital from the viewpoint of potential investors.

Considering the development of industrial areas against the background of the conception of sustainable development, it needs underlining that their expansion must be planned with taking into account a long-term perspective. While preparing the relevant municipal policy, it is advisable to foresee possible unwanted effects of the economic activities run in the area already at the planning stage and, accordingly, adjust both technical and road infrastructure to the changing conditions which are connected with intensive economic development, as well as with export and faster and faster transfer of information. The consequence of a lack of such actions are negative and undesired directions of development of the given industrial area and its surroundings, which manifests itself in spatial conflicts, arduous closeness of enterprises to housing areas, lack of spatial order or noxious transit traffic.

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