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Title: **Methodology for the determination of spatial directions for post-industrial areas with particular emphasis on historical use**

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Today, cities suffer from the negative consequences of space degradation resulting from historical industrial activity. The demise of heavy industry has left its legacy in the form of numerous social, environmental and economic problems. The currently observed consequences directly related to historical industrial activities are historical pollution of the earth's surface or lack of environmental justice. Hazardous substances have long been linked to heavy industrial activities, so historical activities and historic uses should be reviewed in detail when changing the use of brownfield land.

Re-development of post-industrial sites, due to the large scale of degradation, is a significant problem in many Polish cities. The revitalisation of such areas is necessary, but it requires the coordinated action of a comprehensive nature and appropriate tools. The available solutions for selecting spatial development directions for post-industrial areas applied in their revitalisation process are insufficient, so there is a need to develop an appropriate methodology.

The research carried out as part of the dissertation was divided into three main parts, which consisted of five minor stages. The main objective of the study was to develop a methodology for selecting spatial development directions for post-industrial areas with a particular focus on historical use.

The first part included a literature study on the analysis of the needs for the revitalisation of brownfield sites, taking into account the scale of space degradation and social, environmental and economic costs, which allowed the identification of knowledge gaps in the process of brownfield revitalisation. Then, out of all the post-industrial sites in Poland, the study area was selected to be the city of Starachowice due to the centuries-old industrial traditions of the centre. The research was narrowed down to post-industrial areas, as this is the original industrial activity in this place. All subsequent ones appeared in its wake, and it also carries a significant burden in the form of historical pollution of the earth's surface. At this stage, detailed site investigation work was carried out, including field surveys, laboratory analysis and studies of archival material.

The second part focused on constructing a methodology for selecting land use directions for post-industrial areas, which was grounded in decision theory. The development of the methodology included stages such as the characterisation of decision support systems used in the revitalisation of post-industrial sites and the identification of their deficiencies, the development of the methodology architecture including a knowledge base and an inference mechanism based on tools such as fuzzy cognitive maps and the Leopold matrix modified by the author.

In the third part, the developed methodology was tested on a post-smelting area in the centre of the city of Starachowice - Szlakowisko, which has been subject to spontaneous changes since the completion of the smelter furnace to verify its assumptions and mode of operation.

The research and analysis made it possible to formulate conclusions of a unitary (for the Szlakowisko area) as well as general nature. The developed methodology can be universally applied. Its implementation will facilitate the optimal selection of directions for the spatial development of post-industrial areas, with particular emphasis on historical use.

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