

*Public summary of PhD-thesis of Tong Wang*

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## **Planning support system helps to sustainably redevelop industrial sites**

A significant amount of abandoned or not entirely used industrial sites needs to be redeveloped for a sustainable future. Several studies have been conducted for promoting industrial site redevelopment. However, more studies are needed on developing digital tools for analysing industrial site redevelopment impacts on sustainability. The tools should incorporate multi-scale data and different aspects of sustainability evaluation, to be used in the dynamic land use planning process.

This study proposes a planning support system (Sustainable Industrial Site Redevelopment Planning Support System-SIRPSS), which integrates both industrial site level information and regional level information. Moreover, detailed building information is added into the system so that each site can be better presented and evaluated. This system helps to evaluate the redevelopment scenarios based on sustainable indicators from various aspects. As a result, possible impacts of such a redevelopment process on the site and the whole region sustainability can be evaluated in the early stage of the planning.

SIRPSS is composed of four modules, namely a multi-level data integration module, the land use change simulation module, sustainability evaluation module and a case library. The multi-level data integration module applies building information, geospatial, demographic, and environmental data to find suitable target sites for redevelopment. This data integration module also helps to find similar cases that have been redeveloped to the selected target sites.

To find similar cases from the past, a case library which stores industrial site redevelopment experience is constructed. The information of the redeveloped cases is embedded in the system as a knowledge database, which is accomplished by applying case-based reasoning. SIRPSS consults existing redevelopment cases to inductively reason possible redevelopment routes (possible redevelopment scenarios and processes) for the selected target site. The references for redevelopment, given back from the system, serve as a starting point for further discussions among stakeholders.

The chosen redevelopment scenarios for the target industrial site is the input for the land use change simulation module. This simulation process provides dynamic information regarding physical changes which helps in the sustainability evaluation process. Indicator values generated from the simulated land use modelling process, together with other sustainability indicators, are further calculated or analysed in the sustainability evaluation module. This model is used for facilitating to choose a sustainable redevelopment planning scenario. Several web-based tools are developed to show the applicability of the approach.

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