 Definition of Socio-Economic Impacts of Large-Scale Development Projects within Urban Development

Svatopluk Pelčák, Jana Korytárová
BUT, Faculty of Civil Engineering, Veveří 331/95, 602 00 Brno, Czech Republic
pelcak.s@fce.vutbr.cz

Abstract. The article focuses on the socio-economic impacts of large-scale urban development projects in cities. Both in Czech cities and large cities around the world, there is increasing pressure on converting previously unused areas (“greenfields”) as well as the areas that no longer serve their original purpose and are inefficiently used (“brownfields”) to new use purposes. As a result, public administration representatives face a difficult decision on how to change the use of these areas to be consistent with the current zoning plan. The resulting decision has to be explained to the public in such a way that they feel they meet the public needs and interests. Decision-makers need valid and accurate inputs to make the right decisions. Therefore, it is necessary to clearly define and describe the procedure for assessing the benefits of these important revitalization or regeneration projects for various segments of the public. Only a small part of the urban development project impacts is of a purely financial character. Therefore, the evaluation process uses modelling of socio-economic impacts, which are evaluated financially, so that the decision-makers are able to compare the most valid impacts to the initial investment costs necessary for converting the territory into the area with new functional use. The research sample consists of important urban development projects in the largest cities in the Czech Republic. Most of these projects consist have a territorial study, which was established as the main source of relevant information for the analyses. The outputs of the research described in the article build on the previous research of the authors, where they defined 3 basic variables - Incremental capacity of jobs, Incremental capacity of the population and Incremental capacity of visitors as the carriers of following project socio-economic impacts on the territory. The research article presents a list of socio-economic impacts defined on the basis of incremental capacities.

1. Introduction
Spatial planning is one of the important tools of sustainable city development. The general overview of how sustainable city development should look like is determined by several strategic documents of both the European Union and the individual states. In the Czech Republic, the process of territorial development is addressed by several key documents. The national document Principles of Territorial Development [1] represents a territorial analytical basis dealing with the requirements for the efficient and economical territorial organization in relation to, for example, public benefit constructions, territorial studies prepared in the form of Regulatory Plans at the regional level and then the Zoning...
Plans at the municipal level [1]. Within this zoning plan, municipalities define what type of buildings should be allowed in certain parts of the city, what height level should be allowed, what should be the floor area index/coefficient, and in recent plans also what should be the proportion of green spaces in the new urban development. All these documents and many others serve as certain limits for construction development. These limits play a crucial role both in the territory development planning and as a communication tool for private construction developers to make it clear which direction the city should develop. One of the models of sustainable cities, on the basis of which zoning plans are currently being created in the Czech Republic, is the so-called "short-distance city". This term means that the inhabitants of cities/municipalities should be able to satisfy most of their daily needs in a relatively short time. This means that every part of the city should include enough services of all kinds to meet most of the daily needs of its inhabitants. This, therefore, represents the development of the cities with more centres and a mix of functions within the proximity of housing, job opportunities and local amenities in order to reduce the demand for transport and support the revitalization of urban areas and housing estates on the city outskirts. This model of development and modification to current zoning plans responds to a frequent phenomenon in larger Czech cities, where there are urban districts composed almost exclusively of, for example, residential buildings. These locations tend to become almost completely depopulated during the day since their inhabitants travel to other parts of the city to satisfy their needs (work, shopping, schooling, etc.).

Therefore, the research presented in this article is focused on the evaluation of the societal impacts of territorial development projects, especially in the context of sustainable city development.

2. Materials and methods
Sustainable city development is directly reliant on the concept of urban sustainability. Urban sustainability is a multi-dimensional concept that includes environmental, economic, social and political dimensions [2][3]. According to The World Commission for Environment and Development: “Sustainable development is the development that fulfils current needs without endangering the possibility for future generations fulfilling theirs” [4]. The concept of sustainable development, as introduced by both the European and global organisations, highlights the complementarity of actions in multiple policy areas – namely: the social, economic and environmental areas – in setting local governments trajectories and goals. [5] Individual policies of a particular country or city have a decisive role in determining a specific sustainable city development plan. The main entity that guarantees that the cities are developed sustainably is therefore the city itself – the municipality. This municipality has one specific tool to coordinate city development – a zoning plan. The zoning plan sets out the basic concept of the development of the municipality, the protection of its values, its area and spatial arrangement, the layout of the landscape and the concept of public infrastructure. It shall define the built-up areas, areas and corridors and determine the conditions for the use of such areas and corridors. [6] If the intention of a specific development project seems beneficial for the cities, it is possible to discuss a change to the zoning plan for its possible implementation. In such a case, the municipality faces the task of assessing if the project is beneficial for the city. The basic document at this level is territorial studies, which serve to verify the possibilities of using a specific area. [6] These studies allow the municipality to outline the future layout of the area, including its basic attributes. The subject of the research is to determine what impact the project shall have on sustainable city development. The financial and socio-economic flows resulting from its impacts appear to be a long-term comprehensible tool for communicating the project impacts. It is necessary to take into account both economic and environmental and social impacts for its evaluation. [7] In summary, these are called socio-economic impacts, which are discussed in detail below.

The research database of territorial development projects, which are the subject of research and which were submitted in the form of territorial studies [6], serving to verify the possibility and conditions of changes to the territory, was updated and supplemented as part of the research. The data contained in
the territorial studies of the research sample differ in content, however, 3 basic variables for the territory can be determined from them – these are the incremental capacity of residents, the incremental capacity of jobs, and the incremental capacity of visitors. The output of the research is territorial development projects that have an impact on the municipality and result from the above-mentioned incremental capacities [8]. The Cost-benefit analysis was determined throughout previous research as a valid framework for evaluation of project impacts via the Economic Net Present Value of territory (ENPV) ratio [9].

The land-use plan defines the urban concept, the concept of landscape organization and the concept of public infrastructure, the built-up area, areas and corridors and sets the conditions for the use of these areas and other activities affecting the development of the territory. It supports efforts to make full use of the potential of the territory during its possible subsequent development [10]. Thus, it allows for land use alternatives and it is important to find out how these alternatives can contribute to the efficient use of the territory in the context of its surroundings and in connection with strategic urban development plans.

3. Results and discussion
A database of large-scale development projects in the 3 largest cities in the Czech Republic - Prague, Brno and Ostrava – has been gradually compiled as a part of the research. Data is obtained from publicly available territorial studies. The sample was reduced to 10 projects from the surveyed sample of 23 projects due to the lack of necessary data contained in the studies.

Furthermore, a database of major social, environmental and technical changes in the development area which were defined by territorial studies and which shall cause potential socio-economic impacts were compiled. Their basic list is given in the following Table 1.

| Change description                           | Change designation |
|---------------------------------------------|--------------------|
| Incremental capacity of residents           | IC<sub>R</sub>     |
| Incremental capacity of jobs                | IC<sub>J</sub>     |
| Incremental capacity of visitors            | IC<sub>V</sub>     |
| Incremental capacity of kindergartens       | IC<sub>KG</sub>    |
| Incremental capacity of primary schools     | IC<sub>ES</sub>    |
| Incremental capacity of secondary school    | IC<sub>HS</sub>    |
| Incremental capacity of green spaces        | IC<sub>G</sub>     |
| Incremental capacity of transport infrastructure | IC<sub>TI</sub> |
| Incremental capacity of backbone infrastructure | IC<sub>B</sub>    |
| Incremental capacity of parking places      | IC<sub>PF</sub>    |

Table 2 which lists the specific values of changes in the individual researched projects was created based on the presumed changes listed in Table 1.
Table 2. Values of individual changes due to a project implemented in the location

| General project description | Incremental capacity |
|-----------------------------|----------------------|
| **n** | **Location** | **Territory character** | **A ha** | **R No. of person** | **J No. of person** | **V No. of person** | **PP No. of person** | **KG No. of person** | **ES No. of person** | **HS No. of person** | **G No. of person** |
| 1 | Smíchov City | Complete block of urban development | 20 | 3,300 | 9,000 | x | 1,083 | 119 | 333 | 218 | 20,000 |
| 2 | Holešovice Bubny-Zátory | City district with complete civic amenities | 11 | 0 | 24,117 | 28,857 | 2,000 | 12,731 | 868 | 2,436 | 1,592 | 281,47 |
| 3 | Jílové u Prahy - Za humny | Residential | 6 | 152 | 0 | 0 | 38 | 0 | 0 | 0 | 9,308 |
| 4 | Zbrojovka | City district with complete civic amenities | 22 | 6,037 | 9,025 | 7,829 | 11,318 | 217 | 610 | 398 | 28,030 |
| 5 | Kamenný vrch | Residential | 12 | 2,500 | x | x | x | 40 | 0 | 0 | x |
| 6 | Na kaménkách | Residential with basic civic amenities | 27 | 4,351 | 2,597 | x | 3,576 | 120 | 450 | x | 61,901 |
| 7 | Červený kopec | City district with complete civic amenities | 11 | 8 | 9,570 | 5,820 | x | 6,278 | 250 | 600 | x | 229,44 |
| 8 | Sádová | Residential with basic civic amenities and gardens | 13 | 8 | 3,329 | 0 | x | 290 | 120 | 450 | x | 1,109 |
| 9 | Špitálka and surroundings | City district with complete civic amenities | 16 | 0 | 16,600 | 25,159 | 46,000 | x | 500 | 1,500 | x | 126,14 |
| 10 | Stará Ves nad Ondřejnicí | Residential | 11 | 266 | 0 | x | 14 | x | x | x | 16,140 |

Source: Author’s own processing

Table 2 shows the specific values of changes, which were subsequently evaluated and their values represent the input data for the calculations of economic efficiency of the territory. Some studies do not provide all the necessary values, this data shall be further supplemented within further research from other sources.
The possible impacts of the above-described changes in the territory were analysed as part of the research and possible ways of their evaluation were proposed so that it was possible to determine the input values of economic income cash flows as one of the most important parts of the Cost-benefit analysis. The outputs of the analysis are socio-economic impacts. Their list with a specification which of the identified changes in the territory are their bearers is summarized in Table 3.

Table 3. Socio-economic impacts of large-scale development projects

| Socio-economic impact                                      | Change in the territory |
|-----------------------------------------------------------|-------------------------|
| **Public budgets**                                        |                         |
| Increasing the economic performance of the location       | IC_R, IC_V, IC_I, IC_G  |
| Property tax revenue                                      | IC_R                    |
| **Employment**                                            |                         |
| Increasing employment in the location                     | IC_J                    |
| Improving the qualification of employees                  | IC_HS                   |
| **Environment**                                           |                         |
| Reduction in non-greenhouse gas emissions                  | IC_G, IC_Tp             |
| Reduction in greenhouse gas emissions                      | IC_Tp                   |
| Reduction in noise emissions                              | IC_G, IC_Tp             |
| Increase in the time spent in the public space of the     | IC_G                    |
| location                                                  |                         |
| Improving the health of the population                     | IC_G, IC_Tp             |
| **Transport infrastructure**                              |                         |
| Savings in travel time                                    | IC_Tp, IC_R, IC_V, IC_J |
| Infrastructure operating cost savings                      | IC_Tp                   |
| Saving in vehicle operating costs                         | IC_Tp, IC_R, IC_V, IC_J |
| Savings in time for parking                               | IC_Tp, IC_R, IC_V, IC_J |
| Increasing traffic safety (reducing material damage and   | IC_Tp, IC_R, IC_V, IC_J |
| injuries)                                                 |                         |

*Source: Author’s own processing*

The socio-economic impacts described above may represent either benefits or harms for the territory, depending on the character of the change that is caused by the project.

**Public budgets**
The increase in public budget revenues is mainly affected by 2 impacts of the considered changes in the territory. This is a potential increase in property tax revenue, which is levied on the property in the location. The second potential benefit is an increase in the economic performance of the location related to the increase in the number of persons (residents, employees and visitors) who are expected to carry out their activities in the territory.

**Employment**
The socio-economic impacts of increased employment rate are reflected primarily in the labour market. The increase in the number of jobs reduces the burden on public budgets and thus leads to significant savings in public funds, which are allocated to support the unemployed. The second benefit is an increase in the level of qualification and thus employment in the market with higher incomes, which generates
higher revenues from income taxes to public budgets, and also represents the purchasing power to increase corporate sales. In this context, it is desirable to take into account the level and field of increasing the level of qualification (e.g. the specialisation of secondary schools) in the context of current labour market requirements since not every increase in the level of qualification necessarily leads to the positive effects mentioned above.

Environment
The environment plays an important role in the life quality of society in general. In the context of the strategy of "short-distance cities", which is applied in spatial planning in Prague and Brno, it represents the basic building block of this strategy since a poor environment affects both the health of the population and their willingness to spend free time in this environment. A large movement of inhabitants between urban areas, according to this strategy, considered undesirable as they lead to many problems within the transport infrastructure from overloading its capacity, through the wear of roads to time inefficiency and emissions of particles into the air. Therefore, the aim is to provide such an environment for each location so that its inhabitants have fewer reasons to travel outside their area of residence.

The mentioned benefits are focused mainly on 2 areas of the environment that the municipality can influence when planning its development - the impacts of transport and the impacts of green development on the environment. The impacts of transport on the environment concerns mainly the area of particle emissions into the air (greenhouse gas emissions - especially CO₂, non-greenhouse gas emissions - especially dust particles, noise emissions, etc.). All the above-mentioned impacts negatively affect the environment of the area. Their reduction is therefore an explicit benefit for society. The second category of benefits is the development of greenery in the location. The development of green spaces has significant positive effects both on the mental health of the population and leads to the willingness of people to spend more time in this environment. In addition, exercise tools are often part of the design of these green spaces - so there is an obvious benefit for the health of the population.

Transport infrastructure
Transport infrastructure is one of the most important, however also the most controversial elements of city planning. This is due to the level of how significantly it shapes the public space of cities. This is one of the reasons why the impact of this infrastructure is taken into account with great respect in project planning. The determining element is both how much space is delimited to traffic and how the model of individual types of transport within the city is chosen. The impacts mentioned below are generally applicable to any transport infrastructure network in the cities, however, their proportion is largely determined by how much space is given to passenger transport by vehicles, to public transport or alternative modes of transport (bicycle, electric scooters, etc.). The basic benefit that can be obtained by developing a transport infrastructure network is time savings. It is possible to distinguish time savings in individual types of transport, but also time savings when parking - for example, when building public parking spaces. Another important impact is financial savings, especially savings in road maintenance. If the transport infrastructure is disproportionately loaded, there is more wear and tear and thus maintenance costs increase. Conversely, when the roads are unsatisfactory in terms of capacity and congestions occur, an increase in collisions can be expected, and thus damage to private as well as public property. Accidents are also related to the health of road users, as they can lead to various types of injuries. This problem is multiplied when different types of vehicles (bicycles, cars, motorcycles) are mixed on one road. When these means of transport are separated into dedicated lanes, there may be a significant reduction in accidents and thus societal savings.

4. Conclusions
Large-scale development projects represent a very important topic of urban development with the transformation of areas of hundreds of hectares lying in the vicinity to the centres of the most important Czech cities. It is not possible to say with certainty when society will once again have the opportunity
to intervene in the functional structures of cities on such a scale. Therefore, appropriate socio-economic models need to be found to support a decision-making process on how the locations should be developed. The research identified such changes in the projects that are directly linked to the socio-economic impacts within the society. Subsequently, it was examined whether it is possible to obtain this data from the documents for spatial planning. The research found that the most relevant information is contained in territorial studies. Based on a sample of 10 territorial studies of large-scale development projects in Prague, Brno and Ostrava, the hypothesis that at this level it is possible to obtain data on the quantification of individual changes which are listed in Table 1, was verified.

Subsequently, the work focused on defining the individual socio-economic impacts that result from the above-mentioned changes and determining their impacts within society.

The whole research was aimed at evaluating the economic efficiency of a large-scale development project. The expected investment costs of cities spent on the implementation of the necessary transport and technical infrastructure as a preparation of the area for these changes of its use must be compared with the societal benefits to determine the overall investment efficiency for the implementation of the large-scale development projects.

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