

Decision-Making Process Based on Game Theory in the Process of Urban Transformation

Authors : Cemil Akcay, Goksun Yerlikaya

Abstract : Buildings are the living spaces of people with an active role in every aspect of life in today's world. While some structures have survived from the early ages, most of the buildings that completed their lifetime have not transported to the present day. Nowadays, buildings that do not meet the social, economic, and safety requirements of the age return to life with a transformation process. This transformation is called urban transformation. Urban transformation is the renewal of the areas with a risk of disaster and the technological infrastructure required by the structure. The transformation aims to prevent damage to earthquakes and other disasters by rebuilding buildings that have completed their non-earthquake-resistant economic life. It is essential to decide on other issues related to conversion and transformation in places where most of the building stock should transform into the first-degree earthquake belt, such as Istanbul. In urban transformation, property owners, local authority, and contractor must deal at a common point. Considering that hundreds of thousands of property owners are sometimes in the areas of transformation, it is evident how difficult it is to make the deal and decide. For the optimization of these decisions, the use of game theory is foreseeing. The main problem in this study is that the urban transformation is carried out in place, or the building or buildings are transport to a different location. There are many stakeholders in the Istanbul University Cerrahpaşa Medical Faculty Campus, which is planned to be carried out in the process of urban transformation, was tried to solve the game theory applications. An analysis of the decisions given on a real urban transformation project and the logical suitability of decisions taken without the use of game theory were also supervised using game theory. In each step of this study, many decision-makers are classifying according to a specific logical sequence, and in the game trees that emerged as a result of this classification, Nash balances were tried to observe, and optimum decisions were determined. All decisions taken for this project have been subjected to two significant differentiated comparisons using game theory, and as decisions are taken without the use of game theory, and according to the results, solutions for the decision phase of the urban transformation process introduced. The game theory model developed from beginning to the end of the urban transformation process, particularly as a solution to the difficulty of making rational decisions in large-scale projects with many participants in the decision-making process. The use of a decision-making mechanism can provide an optimum answer to the demands of the stakeholders. In today's world for the construction sector, it is also seeing that the game theory is a non-surprising consequence of the fact that it is the most critical issues of planning and making the right decision in future years.

Keywords : urban transformation, the game theory, decision making, multi-actor project

Conference Title : ICCESDCM 2019 : International Conference on Civil Engineering, Structural Design and Construction Management

Conference Location : London, United Kingdom

Conference Dates : December 09-10, 2019