Abstract

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A game theory approach to incentivize private sector in building community service projects

Traffic congestion has increased dramatically in the great Cairo metropolitan area (GCMA) of Egypt. The congestion is due to various reasons including insufficient parking spaces. Currently, building new multi-story garages is not economically attractive for investors in comparison to residential buildings. Thus, there is a need for developing an incentive model to motivate investors into constructing multi-story garages as community service buildings. The objective of this paper is to present a novel decision-making approach for governmental policies that incentivize mid-range investors to construct multi-story garages instead of residential buildings in congested districts. The proposed model utilizes game theory to identify an equilibrium strategy accounting for the needs of investors and governmental agencies. The authors carried out the following three step methodology: (1) develop a parametric game theoretical model that represents the players along with their strategies and payoffs (2) test the model on a hypothetical case study based on actual data for an under construction residential project and (3) analyze the results of the model and its sensitivity to its input parameters. For future work, the proposed model will be validated on a human-lab via a game theoretical platform. Even though the proposed model is developed to address the GCMA's congestion problem, it is dynamic and transformable. The model can be generalized to play a significant role in enhancing the existing infrastructure through incentivizing the private sector to construct community service projects.