Effective Planning of Public Transportation Systems: A Decision Support Application

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Abstract : Decision making on the true planning of the public transportation systems to serve potential users is a must for metropolitan areas. To take attraction of travelers to projected modes of transport, adequately fair overall travel times should be provided. In this fashion, other benefits such as lower traffic congestion, road safety and lower noise and atmospheric pollution may be earned. The congestion which comes with increasing demand of public transportation is becoming a part of our lives and making residents’ life difficult. Hence, regulations should be done to reduce this congestion. To provide a constructive and balanced regulation in public transportation systems, right stations should be located in right places. In this study, it is aimed to design and implement a Decision Support System (DSS) Application to determine the optimal bus stop places for public transport in Istanbul which is one of the biggest and oldest cities in the world. Required information is gathered from IETT (Istanbul Electricity, Tram and Tunnel) Enterprises which manages all public transportation services in Istanbul Metropolitan Area. By using the most real-like values, cost assignments are made. The cost is calculated with the help of equations produced by bi-level optimization model. For this study, 300 buses, 300 drivers, 10 lines and 110 stops are used. The user cost of each station and the operator cost taken place in lines are calculated. Some components like cost, security and noise pollution are considered as significant factors affecting the solution of set covering problem which is mentioned for identifying and locating the minimum number of possible bus stops. Preliminary research and model development for this study refers to previously published article of the corresponding author. Model results are represented with the intent of decision support to the specialists on locating stops effectively.

Keywords : operator cost, bi-level optimization model, user cost, urban transportation

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