

Chapter 8

Microsimulation Analysis of Public Transport: The Case of Bagdat Street, Istanbul

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ABSTRACT

Metropolitan areas around the world are facing traffic congestion and mobility issues. In this context, improving public transportation systems has become a critical requirement for ensuring the sustainability of cities. This study examines the impacts of public transport strategies implemented on Bagdat Street, one of Istanbul's main corridors, on pedestrian and vehicle networks. Using PTV VISSIM for traffic simulation, various scenarios, including changes in bus frequency, capacity, number of stops, and dedicated lanes, were analyzed. Findings reveal that increasing the frequency and reducing the capacity of the existing public transport buses not only improves traffic flow but also enhances passenger satisfaction. These insights provide valuable guidance for urban transportation planning and policy making, which can be adapted to similar contexts in other urban environments.

DOI: 10.4018/979-8-3693-6695-0.ch008

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INTRODUCTION

In contemporary metropolitan areas, transportation-related challenges such as traffic congestion, air and noise pollution, traffic accidents, and the inefficient use of energy and time are prevalent. To address these issues, a range of strategies has been employed, including promoting the use of public transportation (PT), improving infrastructure for bicycles and pedestrians, incentivizing shared and flexible mobility, incorporating environmentally sustainable transportation solutions, integrating different modes of transport, and implementing policies for managing travel demand and pricing. Furthermore, the development of Intelligent Transportation Systems (ITS) and Information and Communication Technology has facilitated innovative approaches such as the prediction of traffic congestion, traffic flow, travel time, and accidents (Kaffash et al., 2021). To mitigate the negative impacts of traffic congestion, policies such as traffic diversion, fuel tax, road taxes, and strengthening PT have been put into action (Abroshan et al., 2021; Bjertnæs, 2019; Isa et al., 2015; Mathew, et al., 2020; Li et al., 2009; Paricio & Lopez-Carmona 2019; Stefanello, et al., 2017; Storchmann, 2001).

The current transportation policies aim to create more socially, environmentally, and economically sustainable cities by promoting the use of PT over private cars (European Commission, 2017). Challenges such as social growth, environmental issues, long travel distances, space competition, and the need for social equality/ justice underscore the importance of increasing PT usage today (Abenoza et al., 2017). PT offers benefits such as energy savings, environmental protection, high passenger capacity, and efficiency. Promoting PT can alleviate traffic congestion caused by private car use (Mokonyama and Venter, 2013), consume less energy, produce fewer emissions per passenger (Waygood et al., 2014), and save approximately 20 times the space for vehicles traveling at 50 km/h (Héran and Ravalet, 2008). Therefore, promoting PT is crucial in reducing traffic congestion, enhancing people's living standards, and improving government public services (Ni et al., 2020).

BACKGROUND

Cities worldwide, particularly in developing countries, are promoting PT services to reduce reliance on vehicles (Hasan et al., 2021). To improve PT services, various measures are being implemented, including special PT lanes (dedicated lanes), limited stops, adjustments to vehicle capacity and frequency, integration with other modes, improved pricing policies, and integration with ITS (Conlon et al., 2001; El-Geneidy & Surprenant-Legault, 2010; Ercolano, 2011; Hasan et al., 2021; Jara-Diaz & Gschwender, 2009; Jara-Diaz et al., 2017; Renne et al., 2016;

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