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ABSTRACT

The present study aims to investigate transportation in Fayoum city and clarify its environmental impacts on the city. The study consists of six chapters preceded by an introduction that deals with the methodology and followed by a conclusion that includes the most significant findings of the study and the recommendations that benefit decision-makers in the city.

The first chapter tackles the general geographical characteristics of the city and its relation to its transportation system. Direct relations between transportation and the location of the city, climate especially heat, solar radiation and wind directions have been found. There are also other direct relations between transportation and the population of the city, urban growth and land use.

The second chapter discusses the street network of the city and accessibility. A set of new models and modern indicators have been used for quantitative analysis of the network, including the network connectivity analysis methodology using GIS, Total Connectivity Index (TCI) and the urban network analysis model developed by Harvard University (UNA) which calculates various centrality indicators such as gravity model, Reach index, and Betweenness. Experimental indicators such as network idle index and street function index have been used, too. This

chapter also studies, sidewalks, bicycles, city entrances and so on.

The third chapter discusses transportation and mobility in the city; the chapter examines the development of transportation and its ownership in the city. Furthermore, it tackles the distribution of transportation in the city as well as traffic morphology and uses an experimental index to demonstrate the role played by each means in the transportation system of the city, namely the transportation efficiency index. Moreover, the chapter discusses the public transportation in the city by drawing its paths and distributing its means. In addition, the performance of this service was analyzed and evaluated through its access index, the concentration of the service, and the role of these means in the accessibility between the city parts.

The fourth chapter discusses the traffic in the streets and entrances of the city. In addition to a set of traffic engineering indicators to analyze the traffic, this chapter uses some geographical indicators such as the spatial concentration index of traffic and an experimental index to assess the traffic performance of the city street network.

The fifth chapter discusses the daily trips in Fayoum city by studying the daily coming trips to the city and the directions of passengers inside the city through the application of 1500 questionnaires to the arriving passengers. It also studies the daily trips of families in the city of Fayoum through a questionnaire applied to 1150 families of the city. In addition, the areas of generating and attracting trips in the city as well as travel behaviors within the city have been identified.

The sixth chapter discusses the problems of the city transportation system. It also examines the environmental problems resulting from the city transportation system: energy consumption, air and noise pollution. It tackles the impact of transportation on the climate change as well as its impact on land consumption. Mathematical models are used in estimating the volume of pollutants and noise resulting from transportation.