Chapter 3
Efficiency Analysis of Turkey’s Transportation System Using Decision Support Model: Data Envelopment Method

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ABSTRACT
Since the European Union has certain targets and criteria that must be fulfilled by its members, Turkey’s situation in transportation compared to the EU member countries (23 countries whose data were accessed) was examined through the approaches of decision support models (Data Envelopment Analysis and Malmquist Index). This study investigates whether Turkey utilizes its road, airway and railway transportation indicators efficiently or not within the framework of the European Union (EU) accession process. In addition, it aims to demonstrate Turkey’s current position compared to other EU countries by performing relative efficiency analysis on road, airway and railway transportation indicators. The conclusions of this study will help policymakers to determine Turkey’s policy objectives for its integration to the EU in terms of transportation indicators.

INTRODUCTION
Traffic is among the prioritized issues for not only Turkey but also other countries. According to the European Transport Safety Council (ETSC), traffic accidents are the main cause of death in all EU countries for those aged 45 and below. It is indicated in various reports published by World Bank that Turkey loses around 2% of its Gross National Product (GNP) every year in traffic accidents, which suggests that the annual socioeconomic cost of traffic accidents in Turkey is nearly 10 billion dollars (Transportation Strategy Report, 2004; Cubuk & Cansiz, 2005, pp. 47-49). Number of vehicles per capita, which is

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among the indicators of economic welfare and development, has reached its peak density especially in cities in recent years. This situation has unsurprisingly increased traffic problems in and out of towns. Given the fact that the volume of road transportation in Turkey is high, Turkey is among the countries with the highest number of traffic accidents. Statistics indicate that over 4000 people are killed and over 200,000 people are injured in traffic accidents every year in Turkey on average. In order to attain a stable performance in preventing accidents and establishing road safety; the characteristics of vehicles, drivers and roads, which are the three main components of the transportation system, need to be addressed as a whole. More than one factor have an impact on the frequency and violence of traffic accidents such as driver behaviors, characteristics of vehicles and roads, environmental factors and traffic characteristics. The causes of traffic accidents in Turkey are distributed as follows: 96.82% drivers, 2.38% pedestrians, 0.16% passengers, 0.32% vehicles, and 0.32% roads. These statistics suggest that the human factor is responsible for traffic accidents by 99.36% (Beasley, 2004).

Traffic safety is among the issues prioritized by Turkey and other countries in the world. In the EU summit held in Helsinki on 10-11 December 1999, Turkey was admitted to candidacy having equal rights with other candidate countries. Thus began Turkey’s accession process to the EU. With this development, Turkey would be required to make extensive adjustments in numerous areas including the transportation industry for a long period. The transportation sector is among the areas on which the creation and implementation of a common policy was put as an obligation in the Rome Treaty. Since the Rome Treaty, which is the foundation of the EU, the primary policy that has been pursued by members is the free circulation of individuals and products. These countries make significant efforts to alleviate the obstacles in their borders. The main components of the common transportation policy addressed within this framework were defined as reducing employment, protecting the environment, being open to competition and providing the best service to the customer with the largest perspective. The main purpose of transportation is to provide the service necessitated by the economic and social targets of national development; with the most convenient qualities demanded by the user; in a way to satisfy national security requirements; in a safe and environmentally-friendly manner; for the cheapest price; using contemporary technologies; and in harmony with international regulations and EU policies; continuously and without any interruption (Aydogdu, 2006).

The safe and comfortable transportation of people and goods within a short period can be achieved by airline transportation. It is well-known that airline transportation accelerates the economic and technological developments in local, regional, national and international scales. Besides, it is thought that airline transportation allows different people to come together and lets them know each. Thus, it also makes social and cultural contributions to the communities.

In recent years, in all around the world, the share of the airline transportation, for people and freight, has increased nearly at the same levels with Gross Domestic Product (GDP). The same relation also holds for Turkey. However, it was observed that, in Turkey, increases and decreases in GDP affected the airline transportation sector more strongly than the other countries. Turkey has been one of the countries with fastest growing airline transportation sector in the recent years. On the other hand, for people and freight, the share of the airline transportation was lower than share of the road transportation. Annually, almost 200 million passengers are transported in Turkey. It is known that nearly 10% of them are transported by means of airline, while this value reaches to 30% in European countries having well-developed airline transportation sectors.