Chapter 3
The Role of ITS Systems on Sustainable Urban Logistics and Transport (SULT)

Metin Mutlu Aydin
https://orcid.org/0000-0001-9470-716X
Ondokuz Mayıs University, Turkey

ABSTRACT

The increasing world population due to developing technology and other opportunities causes serious problems. In particular, serious increases in people's transportation demands due to the increasing population cause significant problems in freight and public transportation in cities. In the last two decades, especially with the significant increase in technology, people have entered into new interactions in transportation with the new opportunities provided by these facilities. Again, evolving economic conditions and technological developments have significantly increased people's demands for both access from one place to another and access to the product. In particular, with the new transportation and transportation concept created by COVID-19, people's desire to access products using a transportation system has triggered the emergence of many new and original solutions in the sector. For this reason, planners and decision-makers have started to use intelligent transportation systems (ITS) effectively to solve this problem quickly and safely.

INTRODUCTION

Intelligent transportation systems (ITS) have enabled transparency in sustainable urban logistics and transport in real time and in advance of operations by facilitating better planning and subsequent performance analysis. These systems also helped the meet the mobility needs in last decade. As known, the need for increased mobility in the recent three decades has led to a substantial rise in vehicle numbers and a saturation of transportation infrastructure. This trend is especially pronounced in cities, where the population has been increasing after 1950s, regularly. As a result, congestion problems, traffic accidents, delays on transportation activities, and pollutions caused by the emissions have been actively

DOI: 10.4018/979-8-3693-1447-0.ch003

observed in cities as one of the most pressing concerns for the transportation planners and authorities (Dimitrakopoulos and Demestichas, 2010). However, simply constructing new infrastructure, such as high-capacity roads or highways, may not be sustainable due to their higher construction and operation costs, the limited land availability and negative effect on the environment (Crainic et al., 2009). Thus, a new approach to improving transportation system performance while supplying travel safety needs to be adopted. This new approach should aim to arrange transportation activities (logistic) more efficient and cost-effective, and to support their crucial effect on developments of cities and countries.

ITS become one of the best systems to supply a sustainable urban logistics and transport (Figure 1). ITSs are designed as the most appropriate solution for the transportation sector, operating at the levels of the overall system, individual vehicles, and personal use (Haynes and Li, 2004; Román et al., 2013; Pan et al., 2014).

ITS have a good potential to solve the problems on capacity utilization, reduce manpower needs, lower the incidence of traffic accidents, and prevent pollution levels by decreasing during all transport activities (He et al., 2010). ITS also supports the sustainable logistic network and systems, effectively (Figure 2). The most popular examples of ITS implementations include many different systems (Aydın and Bıyık, 2023; Zhang et al., 2011).

In transportation exhibitions, companies showcase their latest technology products using terms like "smart" or "intelligent" in many different organizations such as ITS World Congress ITS Europe Con-

Figure 1. Application of intelligent transport systems in road traffic (Stojanovic et al., 2023)