Chapter 9
Information and Communication Technology (ICT) for Intelligent Transportation Systems (ITS)

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ABSTRACT

Transportation is an essential part of human activity that allows people to move from one place to other places. Modern transportation systems refer to intelligent transportation systems (ITS). It has been proven that information and communication technology (ICT) has a significant role to improve the quality and security transportation services. ITS can be described as an integration of computer, electronics, and communication technologies and management strategies that can increase the efficiency and safety of transportation. The application is a platform that manages the vehicles, drivers, passengers, road operators, and managers in an environment that is suitable for everyone to communicate and interact. This chapter presents the history of transportation systems and the role of ICT to bring ITS in different transportation modes. The main motivation of the chapter is to survey the various technology-enabled ITS systems that have been in place, analyzing their strengths and providing recommendations for such ITS systems in developing countries to improve the governance.

INTRODUCTION

Transport or transportation is derived from the Latin trans ("across") and portare ("to carry") which means the movement of people and goods from one place to another. In human history, peoples' feet were the first transportation mode. Animal such as horse, cow, camel, and others were utilized to become transportation mode. People then started the development of traditional transportation modes that operated without machine with a very simple vehicle like a cart. After the invention of machine, a lot of various types of modern vehicles were developed.

The transportation development is triggered by the fact that people need transportation to support their activities, for example going to work or going to school. Moreover, other sectors such as trading and other economic business need transportation to transport huge amounts of goods from one to other places. These needs have already been addressed by the availability of many transportation modes, that is not only land transportation but also water transportation mode and air transportation mode.

The increasing number of people who travel, the number of vehicles and the various transportation modes cause many problems in transportation such as traffic congestion, traffic accident and pollution due to gas emission. These problems further lead the need of intelligent transportation systems (ITS). In the development of ITS, information and communication technology (ICT) plays important role in presenting a safe, secure, effective and efficient transportation system. ICT allows people to save their travel time travel with useful traffic information and good traffic management.

This chapter presents overview on ITS and a survey on the various technology enables ITS systems. Best transportation system with technology enabled applications in developed countries like Japan, Sweden and South Korea provides will also be presented.

ITS AND ITS DEVELOPENT

According to United Nation, the world population recently is about 7.6 billion and his population will increase by 83 million people every year (UN, 2017). In transportation sector, this means that the number of people who mobile also increases. This is indicated by the fact that the number of cars also increases incrementally. This condition will create problem such as pollution and traffic congestion. Pollution can decrease the convenience for the road users. Traffic congestion will cause further complicated problems such as creating stress and losing time for the road user. In business, traffic congestion means also losing revenue. Building new roads might be the solution but in fact this is not a good solution as this will invite people to buy cars. Moreover, the space of the earth is constant. Other conventional solution may not really solve the problems. So, a smart solution namely Intelligent Transport Systems (ITS) are currently being looked at by most countries.

The concept of ITS has actually been initiated since 1980s. It combines high technology and improvements in information systems, communication, sensors, and advanced mathematical methods with the conventional world of surface transportation infrastructure (Sussman, 2005). Later, according to the European Union (EU) Directive 2010/40/EU, ITS is a system in which information and communication technologies are applied in the field of road transport to manage infrastructure, vehicles, users (passengers and decision makers), traffic flows and mobility within cities, and to interface with other modes of transport.

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