Chapter 13
Smart Cities, Smart Mobility: How Mobile Intelligence Is Transforming Urban Transportation

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ABSTRACT

The rapid urbanisation of cities around the world has increased the need for more efficient, intelligent transportation solutions. In this chapter, the mobile intelligence solution that is reshaping city driving leads to the next evolution of cities as smart cities accelerate smart transportation by incorporating V2X communication, Intelligent Transportation Systems (ITS), telematics, and autonomous vehicle technologies. Fundamentally, this means they are good at gathering, sifting through, and using real-time data to minimise traffic congestion and maximise people's safe movement. The chapter opens by defining what is meant by the term smart cities and how smart mobility can be an essential ingredient in making cities efficient. This

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will cover V2X communications, the integrated mode of vehicles, infrastructure and pedestrians, and 5G by building on current solutions to better road safety through major communication systems.

I. INTRODUCTION

Overview of Smart Cities and Mobility

Definition of Smart Cities and the Role of Smart Mobility in Urban Development

A smart city is an urban area where multiple services and facilities are offered based on an interconnected framework of digital technology, data-driven solutions, and the Internet of Things (IoT) to optimize infrastructure and overall civic management (Musa, 2016). According to Kuchta (2014), cities have turned into "smart cities" when they aim to use information technologies to solve daily problems in the lives of citizens. A smart city consistently collects information in order to get a clear overview of the situation or place, analyse the data and use it wisely to upgrade decision-making processes to make an environment work more efficiently for sustainability.

Within this, smart mobility is central to offering residents a range of seamless, efficient and sustainable transport choices. It is a method of incorporating cutting-edge technologies, including IoT, AI and big data analytics, to create smarter public transportation systems, manage traffic flow better, promoting environment-friendly transportation options such as electric vehicles (EVs) and shared mobility services (Vakula & Raviteja, 2017). Smart mobility offers a way to help a city meet its sustainability goals by reducing congestion and emissions while increasing connectivity.

Brief Introduction to Vehicle-to-Everything (V2X) Communication

At the core of smart mobility is *Vehicle-to-Everything (V2X) communication*, which enables vehicles to communicate with each other and their surroundings. This includes:

- **Vehicle-to-Vehicle (V2V)**: Vehicles communicate with one another to share data such as speed, location, and direction to avoid collisions and optimize traffic flow.

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