Chapter 13
Innovative Technologies and Implementation of Autonomous Vehicles in Developments of Urban City

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ABSTRACT

The Autonomous Vehicle is an urban mobility sector user-generative disruptor. The chapter describes the core technology that allows AVs to function—sensory systems,

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machine learning, and the artificial intelligence that orchestrates the autonomous process itself. Finally, how can ACT align itself with urban systems, not just at pragmatic levels, such as what the unavoidable safety issues end up being and in terms of legislation, but with ACT itself considered an infrastructure? It will also consider how A.V.s may affect traffic patterns, as well as environmental sustainability and equity. This chapter elaborates on the myriad systems that a city employs to ensure that a fleet of vehicles does what it is designed to do, arguing that many details of this framework are what innovators will need to build if they hope to succeed. And it also lays out the immediate benefits the innovations provide to the city itself.

INTRODUCTION

The autonomous vehicles (AVs) era is a turning point in the transportation industry that will transform urban mobility in the future. As technology continues to evolve, self-driving cars have transitioned from thought experiments to real-world innovations—and now seem to offer a potential solution to some of the challenges faced by modern urban hubs. Urban areas have become the focal point for AV implementation, with complexities, high density, and increasing demand for sustainable solutions. With their potential to solve a slew of challenges that confront transport systems in urban environments—traffic, safety, environmental impacts, and equitable demand-led mobility, to name but a few—autonomous vehicles arguably have more potential than any previous technology in human history(Li et al., 2015).

The revolution will be driven by a convergence of cutting-edge technologies. Sensor systems—LiDAR (Light Detection and Ranging), radar, and cameras—allow AVs to perceive their environment in real-time, and together they provide the vehicle with an unparalleled situational awareness. These sensors continuously collect immense data, which are uniquely processed with very advanced algorithms to take decisions within milliseconds. These data give a form to machine learning and artificial intelligence (AI), essential parts of self-controlling straight associates that enable the vehicle's programming to learn from past experiences and respond diversely in future circumstances, making the venture toward independent driving expectably exact and intuitive. These advancements have also enhanced the functionalities of AVs, so today self-driving vehicles can navigate complex terrains with little to no driver input(Du, 2016).

However, technological sophistication needed to design technologies and roll out autonomous vehicles in cities is just a slice of the equation. ” Perhaps the biggest challenge is how AVs can coexist with existing infrastructure in any given city. Urban areas are complicated by crowded roads, a range of participants from cars and trucks to pedestrians and cyclists, and, in many cases, outdated infrastructure.