

Chapter 9

Enhancing Automobile Design and Manufacturing Through VR and AR Integration

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ABSTRACT

This chapter focuses on the integration of VR and AR technologies with automobile companies, especially through what transformative impacts they bring along for the design and process of automobile manufacturing. Therefore, with the use of these VR and AR technologies, the car manufacturers are facilitated in producing immersive, interactive experiences to streamline the designs thus producing better visions, prototypings, and testing cars as may be needed. These technologies allow designers and engineers, along with many other stakeholders, to provide collaborative working with real-time access to virtual environments that allow exploring and refining of concepts. Apart from this, AR increases efficiency in manufacturing by speeding up on-site assembly as well as reducing errors. This particular chapter includes case studies demonstrating the successful application of both VR and AR to improve workflow productivity, increase precision, as well as fuel innovation in auto-making.

INTRODUCTION

Integration of Virtual Reality and Augmented Reality technologies into the auto-manufacturing industry brought the era of innovation into this segment, revolutionizing dramatically what vehicles could be designed to be produced, manufactured, and delivered into markets. High-speed development rates in such immersed technologies allow automobile-related firms to improve on both creative and technical aspects in the conception of cars towards better productive, accurate, and more innovative designs. This chapter deals with changes that VR and AR bring into design and manufacture, bringing about immersive and interactive experiences, thus streamlining workflows and introducing more precision (Boboc et al., 2020).

The traditional form of automobile manufacturing is based upon the physical prototypes of cars, designing the car in the virtual environment, with manual and labor-intensive adjustments, which always carry a considerable time loss, cost factor, and loss of accuracy. This paradigm has shifted with the advent of VR and AR technologies that offer virtual environments where designers and engineers can simulate real-world scenarios, iterate on designs, and test concepts with more flexibility and precision. Manufacturers are able to create better visions, prototypes, and test vehicles without being limited by physical boundaries. It is more dynamic and adaptive in approach towards the automobile development lifecycle (Aouam et al., 2018).

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