# Chapter 19
# Digital Twin Integration in Healthcare Marketing Enhancing Patient Experience and Operational Efficiency

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## ABSTRACT

*In healthcare, digital twins transform marketing by understanding patient needs, optimizing resources, and tailoring campaigns. This chapter explores integrating digital twins into marketing, leveraging them to understand patient behaviors and preferences. The Kano model was used to understand the customer expectation, experience, and excitement towards satisfaction which will further leads to developing the marketing strategy for digital twin healthcare sector. It identifies benefits, challenges, and best practices for implementation. Digital twins enable personalized campaigns and optimize resource allocation, leading to improved engagement and satisfaction. This research aims to advance the understanding of how digital twins can transform healthcare provision and enhance patient well-being, ultimately driving improvements in healthcare delivery and patient outcomes*

## 1. INTRODUCTION

In recent years, the healthcare industry has been undergoing a digital transformation. Advancements in technology have enabled healthcare providers to enhance patient care, improve operational efficiency, and streamline processes (Senbekov et al., 2020). With the emergence of digital twins, a concept that has

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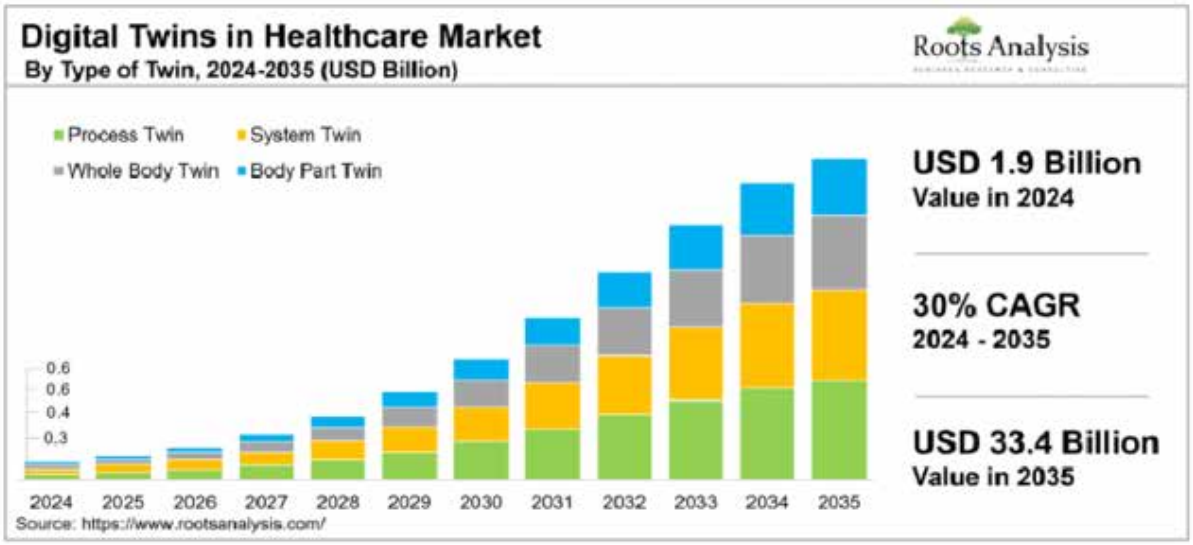
gained significant grip in Industry 4.0, there is a growing interest in exploring the integration of digital twins in healthcare marketing (Pasaribu et al., 2022). The healthcare industry has been rapidly evolving in recent years, with the integration of digital technologies playing a significant role in improving patient outcomes like satisfaction and operational efficiency. The integration of digital twin technology in healthcare marketing has the potential to revolutionize the way healthcare providers interact with patients and streamline their operations.

The global digital twins in healthcare market are projected to experience substantial growth, with its size estimated to increase from $1.9 billion in 2024 to $33.4 billion by 2035. This represents a compound annual growth rate (CAGR) of 30% over the forecast period from 2024 to 2035. This rapid expansion reflects the increasing adoption of digital twin technology in healthcare, driven by its potential to revolutionize patient care, enhance diagnostics, and improve operational efficiency (Root analysis.com, 2024)

*Figure 1. Digital Twin in Healthcare Market Size*




The augmentation of healthcare with digital technologies marks a significant turning point in patient care and operational management. Among the innovations propelling this transformation, the integration of digital twins stands out as a pivotal development. Originating from the manufacturing sector, the concept of a digital twin has been transposed to healthcare marketing to enhance patient experience and improve operational efficiency which results in patient satisfaction. Digital twins provide a highly detailed and dynamic replication of healthcare systems, processes, and patient models, enabling practitioners to forecast outcomes, personalize treatments, and streamline service delivery.

This research paper investigates into the multifaceted role of digital twins in healthcare marketing, examining how this technology fosters a more patient-centric approach while optimizing operational practices. We explore the various dimensions of digital twins, from predictive analytics to customized patient engagement strategies, illustrating how they contribute to both patient well-being and healthcare provision. This chapter will investigate into The Kano model, developed by Noriaki Kano, in 1984 is a