Chapter 6
Revolutionizing Patient Experience Through Digital Twins and Metaverse in Healthcare

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ABSTRACT

This systematic literature review surveys the shared digital twins and metaverse technologies influence on original visualization of patient experience in health delivery systems. Drawing on PRISMA-guided methodology, a synthesis of 25 publications from 2020-2025 uncovered the technologies routing care from episodic provider-driven situations to predictive participatory-patient-centered conditions according to this study. A combined five-pillar framework operationalizes each with quantifiable indicators and implementation pathways. Analysis also reveals a publication bias that favors the publishing of positive results, and highlights the lack of good long-term efficacy research. The study provides insights for healthcare organizations to responsibly implement integrated technologies while making sure that privacy and accessibility standards are strictly maintained.

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1. INTRODUCTION AND CONTEXTUAL BACKGROUND

Each country experiences an outstanding and continuous paradox in the healthcare area. Despite the achievements of modern technologies and the recent scientific breakthroughs, the patient experiences are not pleasant and their needs are not being met (Wachter et.al 2024). The standard method of healthcare delivery is through an appointment for a consultation which generally lasts 15-20 minutes during which the health care provider makes decisions with regard to the treatment based on the fragmented and limited data collected during those brief meetings. Patients are involved in the processes mostly passively. The care provided to them is based on predefined protocols established for population averages rather than their unique physical, social, cultural characteristics, personal circumstances and preferences. This model though was tuned to align with healthcare needs during earlier times is obsolete in the present context of vast data availability.

The central problem is far more than just the issue of engagement. Modern healthcare is encountering the convergence of several pressures which call for absolutely different approaches. With the aged population increasingly suffering from complex multimorbidity, the healthcare system needs to connect and coordinate among a group of providers for managing 5-10 chronic conditions at the same time. With the rising healthcare costs, prevention-oriented approach is needed rather than crisis management (OECD, 2023). The episodic models which exist currently tend to promote more expensive acute treatments rather than affordable preventive measures (Mbata et al, 2024). The manpower deficit, especially in nursing, psychiatry and primary care is a major constraint in health care. Patients in recent times owing to their experiences in other service sectors have reshaped their expectations. They want treatment tailored to their needs (which are different from what is common in the population), treatment transparency (to know the treatment rationale), power to choose (to take part in treatment decisions), and feel a real connection (to be seen as a whole person rather than merely on symptoms).

In healthcare, there exists a situation where the technological capacities considerably exceed the actual usage. Monitoring devices that are in place continuously create massive amounts of data; genomic tests acquire detailed personal biology data; electronic health records have all the necessary information about the history; AI looks for patterns that find out differences across big data; immersive technologies enable interactive environments. In spite of this, the data is most of the time not available, fragmented across overlapping sites, and is not used to its fullest potential for prediction nor for the personalization of treatment. The difference between what can be achieved technologically and what has been implemented in real clinical settings is a unresolved challenge in contemporary healthcare (Mumtaz et al, 2023)