Chapter 3
Immersive Technologies:
Benefits, Challenges, and Predicted Trends

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ABSTRACT

Few digital technologies have captured the world's imagination as much as the cluster of immersive experiences usually labelled virtual reality, augmented reality, and extended reality. A certain mythology has grown up around these technologies, their purpose, application, benefits, and risks. This chapter addresses these elements, offering insights into real-world applications and some thoughts about how the technologies could evolve. A limiting factor when writing about immersive technologies is the lack of comprehensive research into real-life applications and their long-term effects. In addition, there is a tendency for potential users and commentators to become overly optimistic about the latest developments in this niche. This research adopts an interpretivist qualitative approach, based on a review of existing literature and web sources, and the author's personal experiences as an industry professional. What is clear is that these technologies are not a passing fad and are likely to shape the human experience in social, economic, and technological terms in future years.

INTRODUCTION

The terms Virtual Reality (VR), Augmented Reality (AR), and Extended Reality (XR) are often used interchangeably, and yet their innate technical differences, challenges and opportunities for application need to be understood better. Collectively, these technologies are pushing the boundaries to change how we create and experience content, allowing the consumer to be immersed in a simulated world, rather than merely observing it passively through a 2D screen. They are thus often collectively grouped together under the umbrella term "immersive technologies". Nevertheless, there needs to be a clearer appreciation of their individual benefits and limitations to avoid the risk of over-promising and under-delivering.

From a commercial perspective, immersive technologies are gaining significant ground in adoption. Goldman Sachs' researchers see video gaming as the industry's most promising use case, with live events and video entertainment being the other major consumer-focused application of VR/AR technology. They

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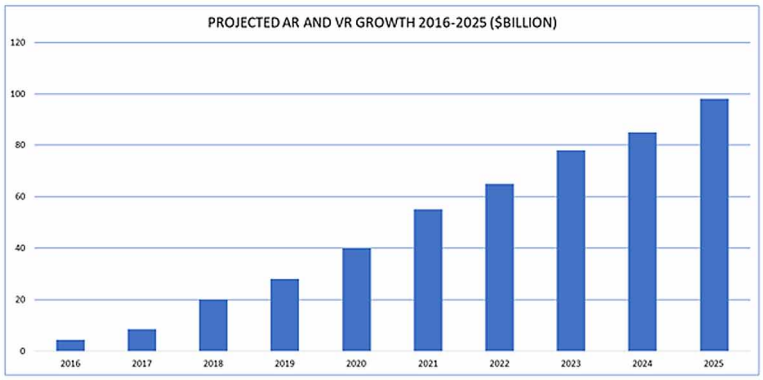
predict that the industry will reach a value of $80 billion a year ($35 billion software and $45 billion hardware) by 2025 (vStream Digital Media, 2018). In comparison, the World Economic Forum (cited in Hall and Takahashi, 2017, September 8) are predicting revenues of closer to $95 billion in growth of VR, AR, and XR applications (Figure 1). These predictions take into consideration a wider range of sector applications, including enterprise as well as individual consumers, going beyond Goldman Sachs' reference points of video gaming and entertainment sectors only (Hall & Takahashi, 2017).

Figure 1. Projected AR and VR turnover growth ($US billion) 2016-2025
(World Economic Forum, cited in Hall and Takahashi, 2017, September 8, para.4)



More recent research appears to indicate even greater levels of optimism in the commercial potential. IDC European Insights and Analysis estimates a 5-year compound annual growth rate (CAGR) in AR/VR spending of 76.9% worldwide in 2019–2024, to reach $136.9 billion by 2024 (Carosella, 2020, July 20).

Which set of predictions should one choose to believe? In the author's opinion and experience, any prediction from 2020 onwards should consider the impact of the 2020/21 pandemic on two counts:

1. There will likely be increased consumption of immersive experiences by individual consumers for both entertainment and retail shopping purposes, triggered by the impact of social isolation.
2. Enterprises will adopt immersive technologies more readily, to improve productivity, product design quality, cost reductions and increased online consumer engagement, in an attempt to offset revenue and profitability losses triggered by the pandemic.

Whichever predictions turn out to be the most accurate (with the benefit of hindsight in the future) they are, overall, driving high levels of investor confidence in this market domain.

As with all emerging technologies, the excitement of adoption needs to be balanced with an objective assessment of the risks, benefits, and opportunities, which may vary between the disparate audiences and target user groups. To this end, the next section in this chapter briefly discusses some of the origins and meanings of immersive technologies. The frame of reference, based on an integrative literature review and the personal experiences of the author, is then presented. The following section details the main findings of the study, assessing the impact of these technologies in various sectors – healthcare, manufacturing, education, defence and military, and entertainment, and citing a number of use cases.