

Reality–Creating Technologies as a Global Phenomenon

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EXECUTIVE SUMMARY

Digital reality technologies have become a global phenomenon that attracts huge attention from researchers and practitioners around the world. ResearchandMarkets.com predicts that the global revenue for both augmented reality (AR) and virtual reality (VR) applications will reach \$94.4 billion by 2023. As an introductory chapter to the edited book volume on the global impacts of digital reality technologies, this chapter examines the current state of digital reality technologies around the world. Global, regional, and country statistics are presented to shed light on the diffusion of a variety of digital reality technologies such as augmented reality, mixed reality, and virtual reality. Potential and existing digital reality technologies around the world will be examined in greater detail to provide readers with contextual information for the remaining chapters of the book.

INTRODUCTION

The Global Digital Reality Technology Market

The term, digital reality technology, is proposed by Deloitte Consulting LLP & Consumer Technology Association (2018), to refer to a set of technologies that are able to immerse users in a computer-generated virtual environment. Because of their technical capabilities and potentialities to separate users from their actual physical world through augmented (AR), mixed (MR), and virtual reality (VR), these technologies are also called *immersive technologies* in the literature (Forbes, Kinnell, & Goh, 2018) and trade publications (*eMarketer.com*, 2018a, b, c, d, e, f). Some scholars have expanded the scope of digital reality technology to cover video games, virtual worlds, and social networking technologies (Wortley, 2011).

Virtual reality (VR) is an immersive technology that aims to reduce users' other sensory inputs, except those presented to them through a head-mounted or helmet-mounted display (HDM) device (Herschman, 2017). Augmented reality (AR), on the other hand, is different from virtual reality (VR)

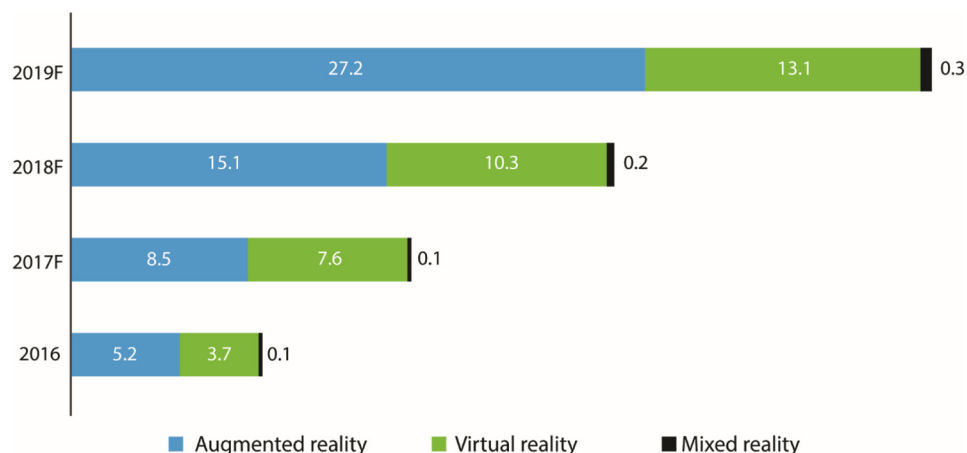
because, unlike the need for a specialized head-mounted display (HMD), AR can be easily accessed through user's smartphone and mobile devices (Petrock, 2018). AR users are able to interact with "[o]verlaying of images in physical contexts via the augmented reality feature" (de Gortari, 2018, n.p.). This technological advance has made digital reality technologies "closer to mainstream" (Petrock, 2018, n.p.). Furthermore, unlike VR, users need to rely on external audio and visual inputs as part of their interactions with the virtual environment (Herschman, 2017). Unlike AR and VR that offer mostly "synthetic" (graphic) contents, 360-degree video is able to offer real-world contents, captured by "omnidirectional camera rigs" (Pagés, Amlianitis, Monaghan, Ondřej, & Smolić, 2018, p. 192).

In Figure 1, the global AR, MR, and VR markets have grown from USD\$9 billion in 2016, expects to grow to USD\$25.6 billion in 2018, and will reach USD\$40.6 in 2019 (Deloitte Consulting LLP & Consumer Technology Association, 2018). Divided by core AR, MR, and VR technologies, AR has surpassed VR in 2016 in terms of its market size of USD\$5.2 billion vs. USD\$3.7 billion in 2016. Due to rapid diffusion of smartphone and related apps, AR's growth is expected to continue and exceed other immersive technologies such as VR at USD\$13.1 billion and MR at USD\$0.3 billion in 2019 (Deloitte Consulting LLP & Consumer Technology Association, 2018). Despite the promising prediction of MR, its market size is relatively unimportant, growing from USD\$0.1 billion in 2016, to USD\$0.2 billion in 2018, and USD\$0.3 billion in 2019 (Deloitte Consulting LLP & Consumer Technology Association, 2018). Refer to Figure 1 below for more details.

The global virtual reality market has been predicted to grow intensely between 2017 and 2027 (*Business Wire*, 2018). In particular, in the healthcare area, VR applications have seen a rapid growth (*eMarketer Editor*, 2018). In addition, entertainment, gaming, and sports account for the majority of VR applications (Petrock, 2018). According to a 2017 survey conducted by *eMarketer.com*, 74% of the respondents indicate that gaming will be most impacted by VR technology, followed by education (36%), architecture, engineering, and construction (32%), medical and healthcare (30%), creative and culture industries (such as broadcasting, film, and TV) (27%), and marketing communication sectors (27%) (Petrock, 2018).

Among four billion Internet users around the world, the ownership of a VR headset is comparatively low to support its full potential, even across different geographic regions (Petrock, 2018). In North

Figure 1. Digital reality technology market around the world



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