Disruption Profile: Immersive AR and VR Technologies Transform Computing Experiences

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AR, VR and MR technologies significantly advance the quality, fidelity and dimensionality of human-to-computer interactions. CIOs who are leveraging disruptive technology trends will benefit from integrating immersive screens, but it will take years for the disruption to be fully realized.

Key Findings

- Immersive technology is currently low-rated on the Digital Disruption (DD) Scale (rated at DD2), as businesses use it to gain efficiency or provide novel user experiences. It will move to DD3 in 2023 as immersive technology advances and as screens proliferate and gain acceptance.

- The disruptive impact of the change in location of the screen, from table to head, will be felt across a wide range of business scenarios as it enables a new class of computing experiences.

- All digital giants (Apple, Google, Microsoft and so forth) have significant long-term investments in immersive displays and interactive computer graphics, with emerging ecosystems that will become established platforms.

Recommendations

CIOs working with chief strategy officers on building digital disruption and innovation must:

- Identify use cases in which immersive technology can help business operations or products, by improving efficiency or functionality, in areas such as field service or manufacturing processes or for consumers, such as in entertainment.

- Decide within the next five years which immersive technology solutions will accelerate existing business practices, or invent new ones that will disrupt competitors.

- Choose established platforms as technology partners to best leverage internal resources.

Table of Contents

List of Tables

List of Figures

Strategic Planning Assumption

By 2020, augmented reality (AR) applications on mobile devices will be adopted in 30% of large enterprises as part of their digital transformation strategy.

Analysis

Definition

AR/virtual reality (VR) and the more advanced technology, often called mixed reality (MR), form a technology trend that is reshaping the visual component of computing experiences. Immersive technologies will transform the way people interact with digital mesh-based devices and their physical counterpart, or will provide new and novel ones.

These technologies go well beyond flat screens, keyboards, mice and touch, and they more deeply connect people to their business data using 3D interactive computer graphics. Immersive technology offers the capability to expertly mix the real and virtual worlds. It also offers all types of businesses a variety of opportunities related to new user experiences and workplace efficiencies.

An example, and one that is visual, comes from GE Renewable Energy and its technology partner Upskill. The two worked together to enable a factory employee to receive wiring installation instructions by wearing a head-mounted display (HMD), instead of reading a traditional paper manual. The employee was able to complete work significantly faster.[1]

Impact and Position

Immersive technologies enable a new type of information platform, based on the mixing of real-time graphics, audio (and in some cases, haptics) with our regular world. While AR and VR were invented decades ago, it is only now that AR/VR devices, apps and services are available to most businesses. Still, they are far from reaching maturity. Businesses and consumers are likely to benefit the most as these technologies mature as they'll get new ways to use digital technologies that are more natural in their interactions and better fit the way they want to work and play.

The range of display types and what they could enable means immersive technology is more than a passing fad. Computing systems have always evolved around their user experience. The core value of immersive technology is that it disrupts the traditional computing experience with ones that are significantly novel and better.

Immersive technology is entering DD2 today but will increase to DD3 by 2023 (see Figure 1).

Figure 1. Immersive Technology on the Digital Disruption Scale

Immersive Technology on the Digital Disruption Scale

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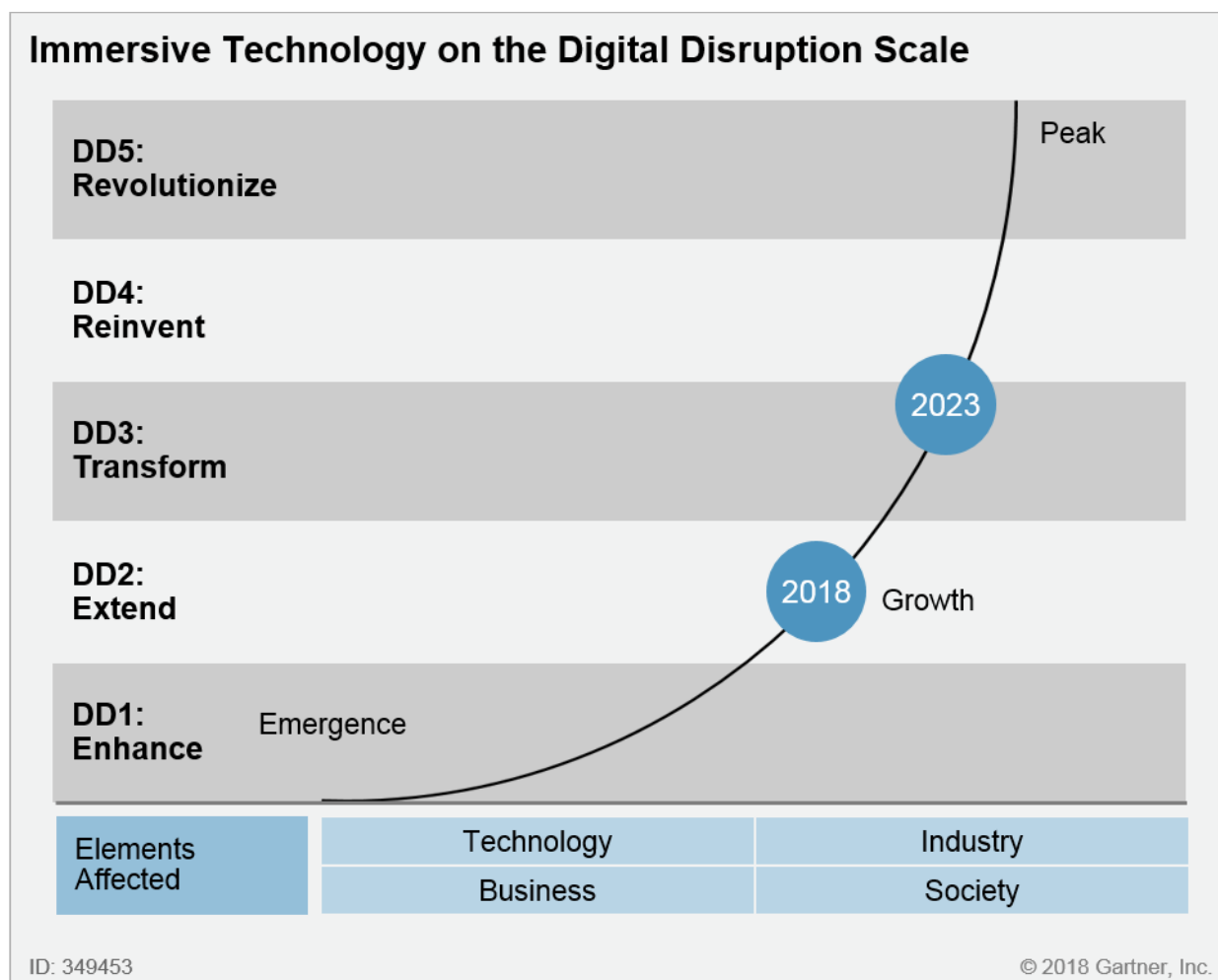
Source: Gartner (February 2018)

The DD time scale for immersive technology represents a small slice of its entire lifetime. Invented in 1968, HMD technology and products were slowly advanced. From 1988 through 2001, those advances and interest skyrocketed, but the technology didn't perform as expected. After a 10-year hiatus, which included the immergence of mobile smartphone devices, vendors again picked up the pace of investment and technology development. In the past five years, interest has continued to be strong. The technology's impact, while based more on hype than actual usage, is so strong that it's clear that immersive technology will reach DD4 after 2023. This will occur once HMDs, immersive screens, and AR/VR/MR features and functions find their way into common computing systems.

Elements of Disruption

- **Technology:** Wearing an HMD or using a smart mirror isn't a common activity in 2018. But the technologies are now in the market and available, and as those technologies advance, their use will become commonplace. New immersive technologies that include form factors, transparent

glass displays and advanced environmental sensors will be developed, as will new ecosystems and platforms to support their business use. More importantly, immersive technology won't realize its full impact until the invention of new user interface mechanisms and business models to accompany wearable and other smart displays. With ongoing and sizable investments in foundational immersive technology, its development will likely influence the other disruptive elements (business, industry and society) as it matures and is integrated into common computing systems and screens.

- **Business:** Disruptive elements of immersive technology for businesses stretch from the workplace to consumers. Today, immersive AR and VR provide new and novel experiences, such as viewing your future home as if you were there, or providing remote assistance through "see what I see" immersive capability. As data models migrate from abstract to visual, training employees will become more realistic, and customers will use visualization technology to view and interact with products and services. Also, interactive graphics on many types of screens will disrupt how employees and customers interact with businesses.

- **Industry:** In 2018, industry hasn't yet felt the disruptive impact of immersive technology. But its beginnings can clearly be seen as AR tool providers are self-segmenting into verticalized specializations, such as in medical, manufacturing, retail and training. While some specialties are needed, many providers will move to more general immersive computing platforms to support a wider array of use cases.

- **Society:** Most people want good computing experiences, but they tolerate the ones presented to them. The best experiences are intuitive, don't require training to use, and ultimately mesh with our own human way of interacting with the world. Immersive technology has the potential to transform the core mechanisms of human-to-computer interactions. Along with voice control and artificial intelligence (AI), these systems are already disrupting how society thinks about and uses technology.

Disruptions and Fundamental Shifts

What Is Being Disrupted?

- **The user experience of computing:** Traditional screens will be replaced with immersive ones. Employees will gain contextual information in real time about their tasks. As a result, efficiency will be gained. Customers can be trained on how to use complex equipment, and consumers will have new types of entertainment and purchasing options, all enabled by immersive computing's ability to mesh the real and virtual worlds.

- **Business processes and workflows:** Advancing beyond paper and flat-screen technology will mean efficiency gains, but a change of workflow may be necessary. Immersive screens are in a location different from that of a manual or laptop. Optimization is needed to make best use of how those new screens are integrated into each type of task and job workflow.

- **Personal interactions:** Businesses can benefit from immersive solutions as they can improve businesses' methods of interaction with employees, partners and customers. That new capability defines revenue, market share and branding opportunities. As businesses rely more

on technology, they will seek out advanced ones, such as computer graphics and interactive techniques, that optimize and extend their digital touchpoints.

Secondary Effects

- New technology markets will rise up around the integration of immersive technology, extending the usefulness of some traditional IT services, such as field service or CRM.

- The core nature of digital screen experiences is being redefined. As a consequence, new interoperation and user experience best practices and standards are being invented and adopted. Business and vendor technology suppliers will need to work together to understand how to best design these new types of user experiences.

- The physiological response to long-term HMD usage isn't understood fully and could impact how often a person can use such systems. Solving this problem will open the door to many other types of human-worn assistive technology, such as wearables and electronic clothes.

- The impact of using hyperpersonal data, needed as input for immersive systems, extends across legal and geographic boundaries.

Evidence Matrix

Table 1 provides an evidence matrix.

Table 1. Evidence Matrix

Areas of Disruption	Examples	Today: Direct Effects	Today: Secondary Effects	Five Years Out: Direct Effects	Five Years Out: Secondary Effects
Product, Market or Industry Displacement	Buying houses or cars now includes interactive graphics and AR/VR experiences. All digital giants have significant investment in advancing core immersive technology. New device market for HMD forecast at $18 billion by 2021.	Medium Low	Medium High	Medium High	Medium High
Altered Business Metrics	Early evidence of workplace and per-task efficiency improvements. Hyperpersonalized customer experiences mean new opportunities for businesses to interact with employees and customers.	Low	Medium	Medium	Medium High
Workforce Enhancement or Displacement	Initially, efficiency will be the focus, but long-term disruption to the workforce haven't yet been seen. Potential is high due to the significantly different and personal immersive display.	Low	Medium	Medium	Medium
Altered Work Activity	Experiments and proofs of concept are helping business understand immersive technology today. Potential is moderate but impactful due to the significantly different and personal immersive display capabilities.	Low	Medium	Medium High	Medium
Customer Buying Behavior	Purchasing consumer goods, or when businesses need to purchase a physical asset, will likely encounter interactive graphics during the design, build, marketing or sale of that object. Pokemon Go-like games and smartphone AR will dominate consumer mobile app experiences.	Medium Low	Medium	Medium	Medium
Amount of Spend	It is not yet known if immersive technology can change the value of other products or services on its own, or if its value comes from being integrated as functions and features.	Medium Low	Medium Low	Medium Low	Medium
Macroeconomics	Minimal or none in the next five years.	Low	Low	Medium Low	Medium Low

Source: Gartner (February 2018)

Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Competitive Landscape: Augmented Reality Tools for Enterprise, 2018"

"Cool Vendors in Enterprise Wearable and Immersive Technologies, 2017"

"Top 10 Strategic Technology Trends for 2017: Virtual Reality and Augmented Reality"

"Forecast: Wearable Electronic Devices, Worldwide, 2017"

"Competitive Landscape: HMDs for Augmented Reality and Virtual Reality"

Evidence

[1] "Upskill & GE Renewable Energy: Wind Turbine Wiring Productivity Study Using Skylight." YouTube.

More on This Topic

This is part of an in-depth collection of research. See the collection:

- Research Roundup: Augmented Reality and Virtual Reality

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