Building a Digital Future: The Metaverse

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Initiatives: Technology Innovation

The metaverse promises new, innovative ways for businesses to build a digital future. However, today, emergent metaverses are in their infancy. Enterprise architecture and technology innovation leaders must understand the scope of the metaverse to maximize its potential now and in the future.

Additional Perspectives

- Summary Translation: Building a Digital Future: The Metaverse (11 July 2022)

Overview

Opportunities

- A metaverse is the next level of interaction in the virtual and physical worlds. It will allow people to replicate or enhance their physical activities.
- Emerging metaverses provide the ability to **transport** to, or "go and immerse oneself" in, a virtual world. That world may be a 3D simulation and/or in virtual reality. This offers new opportunities for increased collaboration, connection and engagement with prospective and current customers, employees and citizens through immersive meetings, virtual events and enhanced collaboration tools.
- Soon, the metaverse will **transform** the physical world by bringing the digital to it in a more immersive and interactive way. This allows users to have access to real-time information, collaboration and experiences in the physical world.
- The metaverse brings new capabilities to **transact by** providing an economic foundation through the use of Web 3 technologies such as cryptocurrency, non-fungible tokens (NFTs) and blockchain.

Recommendations

Enterprise architecture and technology innovation leaders, including CTOs, wanting to maximize the current and future potential of metaverse technologies should:

- Task an innovation team to look for opportunities where metaverse technologies could optimize digital business, or create new products and services.
- Work with qualified agencies to evaluate the viability of metaverse technologies in terms of user and customer reach, and engagement rates with new, early-adopter audiences.
- Build metaverse products and solutions through a pipeline of innovation based on combinatorial emergent technologies, rather than a “killer app.”
- Identify metaverse-inspired opportunities by evaluating current high-value use cases vis-a-vis their product or service.
- Develop technology strategies that leverage the built-in infrastructure and participants of the metaverse, and provide digital product or service opportunities.
- Invest in specific emergent metaverses cautiously, as it is still too early to determine which investments will be viable in the long term.

Strategic Planning Assumptions

By 2025, the serious games market will grow by 25% due to the impact of metaverse technologies.

By 2027, a majority of B2C enterprise CMOs will have a dedicated budget for digital humans in metaverse experiences.

By 2025, 10% of workers will regularly use virtual spaces (in activities such as sales, onboarding, remote teams), up from 1% in 2022.

By 2028, 10% of public events (sporting, performing arts, etc.) will offer participation in metaverse, fueling rapid buildout of commercial metaverse shared experiences.

By 2027, 25% of retail organizations with an e-commerce presence will have completed at least one proof of concept for tokenized assets using metaverse technologies.

By 2026, the second and third iterations of spatial computing glasses will arrive, creating a more pervasive metaverse experience connected to the physical world.

What You Need to Know

Technology trends, with proven use cases and business outcomes, are just the beginning of the value technology innovation brings to the enterprise. The longer-term bets are the true differentiators that could disrupt an entire industry, and the metaverse is one of those bets (see Predicts 2022: 4 Technology Bets for Building the Digital Future).

Gartner defines a metaverse as "the next level of interaction in the virtual and physical worlds." Metaverse technologies allow people to replicate or enhance their physical activities. This could happen by transporting or extending physical activities to a virtual world, or by transforming the physical one. Although the goal of a metaverse is to combine many of these activities, there are currently many emerging metaverses with limited functionality.

Today, organizations are harnessing metaverse technologies to:

- Offer a more immersive learning experience for employee onboarding, sales enablement, higher education, and medical, military and other types of training. The goal is that these experiences will not require creating their own infrastructure since the metaverse provides the framework.
- Bring groups of people together in virtual worlds to provide participants with the ability to engage with the space or other participants.
- Extend retail's reach to an immersive shopping experience that allows for more complex products and new digital products.
- Provide better engagement, collaboration and connection to their employees through better immersive workspaces in virtual offices and the use of internal metaverse experiences called intraverses.

The metaverse provides innovative new opportunities and business models, allowing businesses to extend digital business to be persistent, decentralized, collaborative and interoperable.

Six trends are driving the use of metaverse technologies today and will continue to drive its use over the next three to five years (see Figure 1 and Table 1):

1. **Gaming** — creating experiences for both entertainment and training simulations

2. **Digital humans** — interactive, artificial intelligence (AI)-driven representations that exhibit some of the characteristics, personality, knowledge and mindset of a human.

3. **Virtual spaces** — engaging multiple senses and providing participants with the ability to immerse and engage with the space or other participants

4. **Shared experiences** — bringing groups of people together for persistent or defined periods of time

5. **Tokenized assets** — digital assets that are secured, exchanged, traded or utilized for any defined purpose

6. **Spatial computing** — providing digital enhancements and experiences to 3D physical spaces

Figure 1: Build the Digital Future

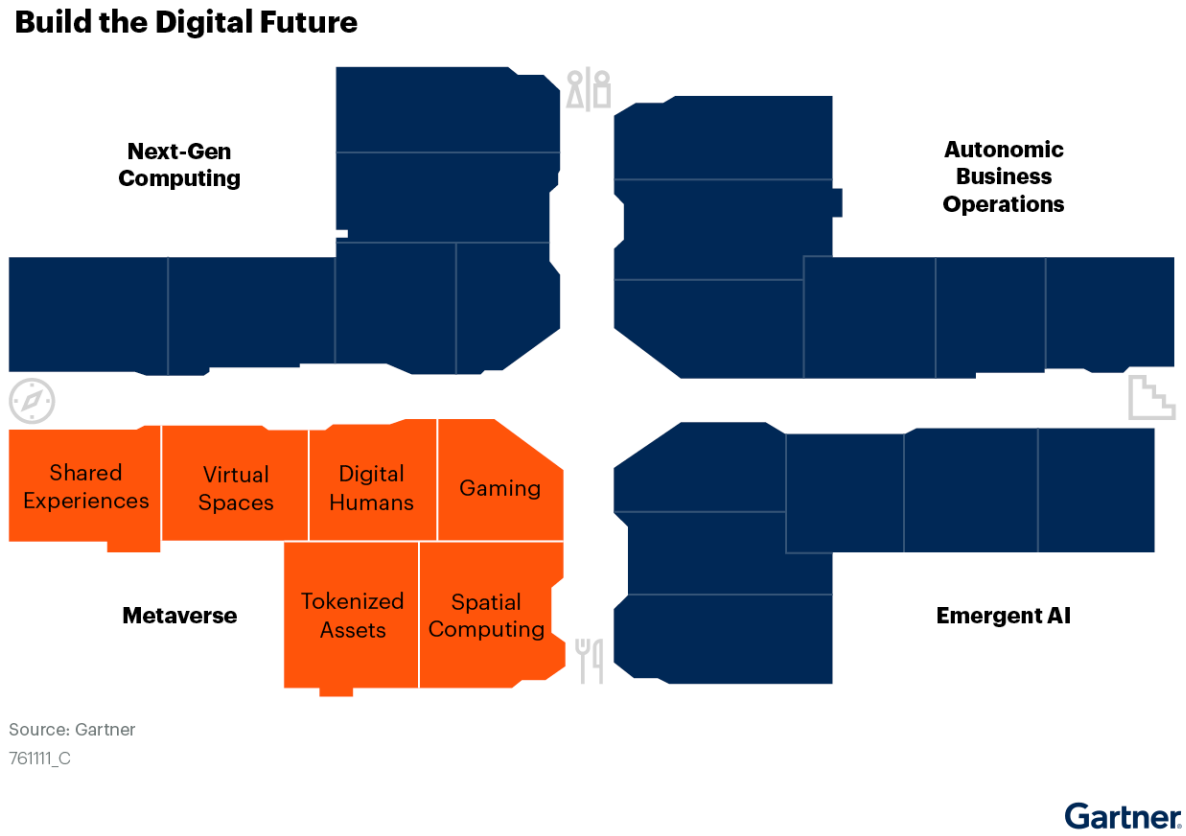

Table 1: Metaverse Trends

(Enlarged table in Appendix)

	Gaming	Digital Humans	Virtual Spaces	Shared Experiences	Tokenized Assets	Spatial Computing
Opportunities	Create "multiplayer" simulations hosted in the metaverse for safety/training purposes	Deploy digital human customer service representatives	Host live events virtually	Immersive meetings for distributed workforce	Selling and trading digital assets (e.g., real estate)	Real-time shopping recommendations at brick-and-mortar locations
Outcomes	Decrease safety incidents by 20% in 18 months	Improve Net Promoter Score by 15% by 2024	Increase opportunities from event participants by 25% in 2024	Improve employee connectivity, collaboration and engagement as demonstrated through employee satisfaction score increases by 25%	Introduce new opportunities for increasing revenue	Increase retail sales by 30% by 2025
Obstacles	Content and experiences are expensive to create.	Digital human technology is still nascent and limited.	It is complex and costly to scale.	Workforce access to needed tools and connectivity is not uniform.	There are cybersecurity and fraud risks.	Technology, especially augmented reality (AR) — glasses still have limited functionality.

Source: Gartner (June 2022)

Despite all of the hype, the adoption of metaverse technologies is nascent and fragmented. Organizations should be careful when investing in a specific metaverse, as it is too early to determine which investments have long-term business viability. Furthermore, this is a time of learning, exploring and preparing for a metaverse with limited implementation. Financial and reputational risks of early investments are not fully known.

While technology plays a key role in achieving a mature metaverse, another challenge involves establishing user-centric guidelines for ethics and governance covering different aspects of the metaverse. This includes topics like privacy, data sovereignty, acceptable terms of use, accountability, identity and legal protections.

Gaming

Analysis by Marty Resnick

SPA: By 2025, the serious games market will grow by 25% due to the impact of metaverse technologies.

Description:

The gaming industry, specifically video games, has been an innovator in the experience and technology space for many years. The metaverse will use gaming technologies, methodologies, development tools and even game theory to build better metaverse experiences.

> **One specific area of gaming that enterprises will adopt is the use of "serious games" — gaming technologies, experiences and storytelling for training and simulation of specific work tasks and functions.**

For example, a serious game may be created to train employees about how to handle hazards so they remain safe in hazardous environments.

Why Trending:

The gaming industry is dedicated to one specific value proposition: The experience of the end user is paramount. If games are not enjoyable due to design issues, poor user experience or technical flaws, the users will quickly leave. This kind of immediate and undeniable feedback forces game developers and platforms to push boundaries. In the video game industry, failure to quickly address these issues will result in an unsuccessful game (see Emerging Technologies: Look to Gaming Innovation for the Future of End-User Experiences).

As enterprises continue their focus on immersive training — learning procedures or practicing scenarios in a simulated or augmented environment — metaverse technologies will provide additional capabilities. They will even provide a "headstart" to developing and deploying these simulations with out-of-the-box features like avatars, multiplayer capabilities, networking and world building.

Implications:

- Immersive training and serious games will continue to grow in popularity at large enterprises.
- Game engines and other development technologies will proliferate as part of enterprise development teams and toolsets.
- Enterprises will adopt metaverse technologies early on to support serious gaming efforts.
- Employee training will be enhanced with better efficacy due to immersive technologies and storytelling available via the metaverse.

Actions:

- Develop a list of specific outcomes that could be supported by serious games, such as decreasing safety-related incidents over a defined period of time.
- Measure the effectiveness of metaverse-hosted serious games versus traditional training methods.
- Reach out to game engine providers to understand enterprise licensing considerations.
- Build out a small team of developers using gaming technologies.
- Expand and augment your development teams with game developers and 3D modelers.

Further Reading:

- Quick Answer: Defining Emerging Technology for HR Leaders — Immersive Technologies

- Emerging Technologies: Look to Gaming Innovation for the Future of End-User Experiences
- Case Study: Enhancing Teaching and Learning With Augmented Reality Headsets

Digital Humans

Analysis by Marty Resnick

SPA: By 2027, a majority of B2C enterprise CMOs will have a dedicated budget for digital humans in metaverse experiences.

Description:

Digital humans are interactive, AI-driven representations that have some of the characteristics, personality, knowledge and mindset of a human. They can interpret speech, gestures and images, and generate their own speech, tone and body language. These traits make them humanlike in appearance and behavior. Digital humans are representations of people, typically rendered as digital twins, digital avatars, humanoid robots or conversational user interfaces.

Why Trending:

Digital humans can interact, learn and express themselves in humanlike ways. These capabilities are driven by natural language understanding and emotion AI. They are rendered by conversational UIs, computer-generated imagery (CGI) and 3D real-time autonomous animation. They open up opportunities for organizations that embrace the technology early. Digital humans enable new business channels, advance digital transformation and create a marketplace-based business model called the digital human economy.

Organizations are already planning on using digital humans to act as identified digital agents within metaverse environments for customer service, support, sales and other interactions with current and potential customers. To use a gaming analogy, digital humans may act as more technically advanced non-player characters (NPC) in metaverse environments.

Implications:

- Companies seeking to create unique, personalized experiences are pursuing digital humans to interact at a higher level with customers to aid in areas such as financial transactions and travel decisions.
- As companies decide on a fully remote or hybrid (remote/office) future, digital humans provide a pathway to overcoming the challenges of remote onboarding and training.
- Companies are already using digital humans as brand influencers, and their success will fuel copycat behavior.
- The act of creating and utilizing digital humans is raising regulatory and ethical concerns.
- The foundations of natural language, computer vision, sentiment analysis and CGI technologies are present, but the capability to fully replicate the personality and characteristics of a human will take years to hone.
- Some customers will reject the idea and demand a real human.
- Customers may treat digital human representatives differently and in ways that have undesirable results.
- Creating high-quality digital humans requires functional improvements in composite AI techniques to bring together speech, vision and conversation.

Actions:

- Track and engage early with digital human technology.
- Assess your current capabilities to provide the prerequisite customer data (such as customer data platform [CDP], CRM and digital experience analytics) needed to supply context to immediate use cases for implementing digital humans.
- Scenario-plan how digital humans fit within your organization as brand ambassadors, service agents and salespeople in metaverse environments.
- Preempt responses to undesirable and unexpected consequences in early, experimental deployments.

Further Reading:

- Maverick* Research: Digital Humans Will Drive Digital Transformation
- Maverick* Research: Nonfungible Tokens Enabling Hyper-Tokenization of Digital Humans
- Quick Answer: 3 Things Consumer Goods Manufacturing CIOs Must Know About the Metaverse
- Predicts 2022: Marketing Builds New Connections

Virtual Spaces

Analysis by Christopher Trueman and Christy Ferguson

SPA: By 2025, 10% of workers will regularly use virtual spaces (in activities such as sales, onboarding, remote teams), up from 1% in 2022.

Description:

A virtual space — or virtual world — is a computer-generated environment where groups of people can come together using personal avatars or holograms. Virtual spaces may be persistent — existing for an indefinite time with changes made by users. They may also exist only for defined periods of time — such as for an event — before being reset, locked or turned off.

Virtual spaces enable collaboration and engagement among staff and the ability to engage with prospective customers to close business and strengthen customer relationships. Virtual spaces enable teams to collaborate, execute dynamic content delivery and integrate with other technologies to deliver world-class immersive experiences for participants.

The simplest virtual spaces are static and present no options for interacting with the environment. More advanced virtual spaces contain dynamic elements, objects that can be interacted with, or offer tools allowing users to add/remove or otherwise alter the virtual space.

Why Trending:

The proliferation of remote work and virtual events has inspired a new focus on virtual engagement and collaboration. Gartner's Technology Marketing Benchmarks Survey [1] revealed that the number of companies sponsoring or investing in third-party virtual events from 2020 to 2022 grew from 55% to 66%. In the same study, those hosting their own virtual events increased from 60% to 67% since 2021, when Gartner started tracking virtual and in-person first-party delivery models separately. While this survey did not differentiate between virtual events with or without the use of virtual spaces, this data reveals a growing market opportunity for event platforms overall, including those that feature virtual spaces. In addition, consumers are becoming more comfortable with virtual space use cases, such as interior design, retail and product experiences.

Implications:

- Virtual spaces increase reach to buyers and consumers who are unable or unwilling to join in-person engagements. Virtual spaces provide new alternatives to travel.
- Spatial audio, used in most virtual spaces, enables sidebar conversations and collaboration by replicating how sounds emanate from their sources as they would in a physical space. Virtual spaces allow for a closer realization of physical collaboration and event spaces than is possible on more traditional platforms.
- A combination of AI-enabled applications such as sentiment analysis, computer vision and conversational interfaces will improve users' experiences in virtual spaces in the near future.
- The market for metaverse services is still in its infancy. Buyers must clearly understand business requirements and articulate desired experiential design elements of virtual spaces. This adds to the complexity of evaluating the limited and disparate providers available today.

Actions:

- Define business requirements to determine whether a virtual space is required to meet the needs of collaboration, meeting and event use cases.
- Ensure your metaverse provider or its partners can provide architects or designers to assist in the creation of virtual spaces. Ensure that your organization has the management capabilities it needs by fully testing the design environment.

- Work with stakeholders to define expectations for integrating existing technology and applications into virtual spaces by examining off-the-shelf integrations available from metaverse providers and piloting/demonstrating the user experience interacting with them from inside a virtual space.

Further Reading:

- Quick Answer: What Emerging Metaverse Capabilities Should Be Prioritized for More Effective Meetings?
- How Emerging Technology for Virtual Meetings Will Impact Your Workforce
- Quick Answer: 3 Things Consumer Goods Manufacturing CIOs Must Know About the Metaverse

Shared Experiences

Analysis by Christopher Trueman

SPA: By 2028, 10% of public events (sporting, performing arts, etc.) will offer participation in metaverse, fueling rapid buildout of commercial metaverse shared experiences.

Description:

A shared experience is the result of any interactions that a group of people can engage in within a virtual space. While shared experiences are often thought of as shared activities, they are not necessarily the same. Users can find shared experiences wherever their journeys overlap, even if the activities they are engaged in differ. Shared experiences are one of the bases for the camaraderie and culture of teams and organizations. Metaverse services can deliver shared experiences because they allow for groups of people to meet and interact within a virtual space.

Why Trending:

Forty-eight percent of business executives have expressed optimistic opinions about the use of metaverse technology based on 71,468 conversations analyzed by Gartner's Social Media Analytics team (37% neutral, 15% concerned). [2] Fifty-one percent of Gen Z and 48% of millennials envision doing some of their work in the metaverse in the next two years, according to Microsoft's 2022 Work Trend Index (see Great Expectations: Making Hybrid Work Work). Organizations are increasingly piloting and deploying metaverse technologies to provide their employees and customers with better shared experiences using immersive technologies. For remote and hybrid workers in particular, shared experiences through technologies have largely replaced shared experiences in-person. Over time, Gartner expects the metaverse and immersive technologies to account for a greater and greater share of employee and consumer shared experiences.

Implications:

- The metaverse will move shared experiences out of siloed immersive applications and allow for more opportunities to meet, collaborate, interact, participate or otherwise share experiences across applications, consumer events and services. In this sense, the metaverse will democratize immersive experiences.
- The more use cases that the metaverse can support, the more points of intersection will be created and the more opportunities for shared experiences will be available.
- These effects will be most pronounced for remote and hybrid workers as the metaverse and immersive technologies can approximate the multisensorial richness of in-person interactions better than existing technologies.

Actions:

- Encourage shared experiences in the metaverse by prioritizing metaverse services that provide rich collaboration features, user interaction options, audience participation and business productivity app integrations when making a selection decision.
- Maximize the opportunity for sharing experiences in the metaverse by implementing a strong change management and adoption program for any metaverse service deployment to ensure the availability of a critical mass of users.

Further Reading:

- Quick Answer: How Will the Metaverse Shape the Digital Employee Experience?

- Quick Answer: How Do I Get Started With Total Experience?
- Top Strategic Technology Trends for 2022: Total Experience

Tokenized Assets

Analysis by Marty Resnick

SPA: By 2027, 25% of retail organizations with an e-commerce presence will have completed at least one proof of concept for tokenized assets using metaverse technologies.

Description:

Tokenized assets can represent just about anything. In metaverse experiences, the main focus on tokenized assets will utilize non-fungible token technologies. NFTs support one of the main attributes of a metaverse, "creator economy." Through the use of NFTs, creators retain ownership rights over their work and the assets their tokens represent. NFTs support new economic models, for example, where content creators perpetually retain most of the revenue from sales of their works. Enterprises are beginning to tokenize real- world assets for many advantageous purposes. NFTs have broad applicability in many markets and will open up new types of marketplaces, for example, in metaverses, that are not possible without them.

Why Trending:

Mature metaverse solutions will enable new markets and economic models. The initial business models we expect to see as the metaverse evolves will be analogous to current ideas (e.g., "do what you know"). Examples include building businesses around artificial scarcity with virtual possessions, NFTs and virtual property. Despite this, the new features and functionalities enabled by the metaverse will require and inspire new ways to not only compete and monetize virtual products and services, but also to acquire physical (real-world) goods (see Emerging Technologies: The Future of the Metaverse).

Implications:

- Tokenized assets offer new business models for content creators.
- Enterprises are creating or buying NFTs to appeal to their customers, especially those engaged in metaverse virtual environments and games.

- Tokenized assets offer the ability to authenticate/validate digital (and, in some cases, physical) goods. For example, authenticating artwork can be a tedious process today. By leveraging NFTs, ownership (in some cases) and authenticity can be validated in real time.
- NFTs, and other forms of tokenized assets, do not require metaverse technologies and could exist outside of metaverse experiences entirely.
- Tokenized assets are not just for buying and selling, but also could be used for user authentication, access to additional experiences and accessorizing avatars.

Actions:

- Conceptualize potential business and monetization models.
- Engage with relevant business leaders to inform and advise on the risks, benefits and limitations of emerging NFT technology.
- Conduct POCs. IT leaders that are interested in the potential of NFTs should conduct early-stage research and investigate how they are made, distributed and monetized.
- Leverage good cybersecurity to ensure that risks are understood and mitigated. As NFTs increase in value, so will attacks (see Quick Answer: How to Protect and Secure the Use and Trading of NFTs).
- Help marketing teams assess competitive activity and NFT issuance and use to support loyalty, couponing and other rewards currency programs that can engage new audiences with new value propositions.
- Use distributed storage systems that support persistent storage, and secure integration with blockchain networks.

Further Reading:

- How Marketers Should Approach the Metaverse
- Emerging Technologies: The Future of the Metaverse
- How Can Blockchain Non-Fungible Tokens (NFTs) Accelerate Digital Transformation?

- Emerging Technologies: Blockchain-Based Tokenization Is for More Than NFTs and Cryptocurrencies

Spatial Computing

Analysis by Tuong Nguyen

SPA: By 2026, the second and third iterations of spatial computing glasses will arrive, creating a more pervasive metaverse experience connected to the physical world.

Description:

Spatial computing is a computing environment that combines physical and digital objects in a shared frame of reference.

Why Trending:

Spatial computing provides visual context for digital objects to interact with the physical world. This allows organizations to get more out of physical and digital assets by surfacing-related, "unseen" digital information and content anchored to people, places and things. Examples include:

- Tethering digital persistent content to augment the physical objects or environments (people, places and things, such as digital colorization of Greek and Roman statues, or additional product, device and object information)
- Defining location and orientation of a digital object in a physical space (such as having a digital signboard facing the correct way on a street for maximum visibility)
- Collaborating within a shared reference frame, such as providing a common perspective for stakeholders working on a digital twin either in the real world or in a virtual space to visualize underlying infrastructure (plumbing, electrical) for buildings

Implications:

- There are opportunities to monetize the physical world via digital content and enable new ways for customers, partners and employees to interact with the physical aspects of an organization.

- Mapping, location and wayfinding technologies to create digital models of the physical world will expand spatial computing use-case effectiveness.
- Tools markets will need to expand to easily create, publish, manage and deliver 3D content such as images, computer-aided design (CAD), business information management (BIM) and digital twins
- Advancements in deep learning will need to be achieved to better process content and sensor data to interpret real-world conditions, and support and automate decisions, and to take actions based on this context.

Actions:

- Developers should democratize the creation of spatial computing experiences by serving as a sandbox for creatives to discover, create and improve on content, experiences, applications and use cases.
- Choose use cases that not only show business value, but will be indispensable. This can be achieved through use cases with clear, proven and repeatable value. An example is highly localized information, such as maintenance records for capital equipment.
- Focus on individualized experiences that depend on the system having access to personal information and preferences.
- Proactively address potential consumer privacy and trust concerns by aligning messaging based on these guidelines.
- Evaluate technologies needed to comply with local regulations by aligning identified risks against stakeholder (individual or organization) rights.

Further Reading:

- Emerging Technologies: Tech Innovators in Augmented Reality — AR Cloud
- Emerging Technologies: Tech Innovators in Augmented Reality — Spatial Web
- Emerging Technologies: The Future of the Metaverse
- Emerging Technologies: Tech Innovators in Augmented Reality — Augmentation and Spatial Interaction Layer

Evidence

[1] **The Gartner 2022 Technology Marketing Benchmarks Survey** was conducted online from 8 March through 9 May 2022. A total of 381 respondents were collected from technology-focused organizations with more than $10 million in revenue located in the U.S., Canada and the U.K. Respondents were required to have one of the following primary job functions/roles: CEO/president/founder, demand/lead generation, marketing leadership, sales leadership, web/digital social marketing, marketing operations/analytics. They were also required to have knowledge of the marketing budget and spend for the company or business unit and knowledge of the marketing campaign/programs tactics. At the country level, quotas were established to guarantee a good distribution in terms of product offering (software, technology services and hardware) and company size (revenue). The survey was developed collaboratively by a team of Gartner analysts and was reviewed, tested and administered by Gartner's Research Data, Analytics and Tools team.

Disclaimer: Results of this study do not represent global findings or the market as a whole but reflect sentiment of the respondents and companies surveyed.

[2] **Social Media Analytics Methodology:** Gartner conducts social listening analysis leveraging third-party data tools to complement or supplement the other fact bases presented in this document. Due to its qualitative and organic nature, the results should not be used separately from the rest of this research. No conclusions should be drawn from this data alone. Social media data in reference is from 1 July 2021 through 11 December 2022 in all geographies (except China) and recognized languages. Fahim Talmeez from the Social Media Analytics team contributed to this research.

Table 1: Metaverse Trends

	Gaming	Digital Humans	Virtual Spaces	Shared Experiences	Tokenized Assets	Spatial Computing
Opportunities	Create "multiplayer" simulations hosted in the metaverse for safety/training purposes	Deploy digital human customer service representatives	Host live events virtually	Immersive meetings for distributed workforce	Selling and trading digital assets (e.g., real estate)	Real-time shopping recommendations at brick-and-mortar locations
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Obstacles	Content and experiences are expensive to create.	Digital human technology is still nascent and limited.	It is complex and costly to scale.	Workforce access to needed tools and connectivity is not uniform.	There are cybersecurity and fraud risks.	Technology, especially augmented reality (AR) — glasses still have limited functionality.

Source: Gartner (June 2022)