Gartner Research Excerpt

Emerging Tech Impact Radar: 2024

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> The most impactful technologies for 2024 fall under these four themes: the smart world, the productivity revolution, privacy and transparency, and critical enablers. Product leaders can use this research to guide their investment and strategic planning around disruptive technologies.

Overview

Key Findings

- The smart world is driven by the convergence of online and offline experiences and by adding contextual relevance, changing how users interact with people, places and things around them.

- Generative AI is spearheading the productivity revolution: improving existing features, adding new functionality and augmenting human potential to use unstructured data systems.

- Increasing digitization of assets, information and experiences and the usage of AI are making privacy and transparency issues increasingly important by increasing opportunities for bad agents to mimic, disrupt and intercept our activities. They are also intensifying concerns around negative consequences of AI tools and techniques.

- Rapid innovation in critical enabling technologies, like Web3, scalable vector databases and neuromorphic computing are creating new possibilities for IT solutions.

Recommendations

Product leaders assessing the impact of emerging technologies and trends on products and services must take the following steps:

- Enhance your competitive differentiation in the smart world by working within an ecosystem of partners to deliver the types and combinations of interactions (such as AI avatars, multimodal UIs and spatial computing) that bring value based on your specific use cases and target markets.

- Prioritize the most prevalent and impactful generative AI use cases, such as conversational AI, content creation and simulation, because these already deliver real value to users.

- Stimulate growth while mitigating risk and restrictive regulation by building user trust via systems such as decentralized identity and behavioral analytics and applying human-centered AI and responsible AI principles.

- Support your strategic product roadmap by identifying relevant emerging technologies and business values that they can enable and identifying relevant innovation tech partners.

Analysis

Overview of the Emerging Tech Impact Radar

The Emerging Tech Impact Radar highlights the technologies and trends that have the most potential to disrupt a broad cross-section of markets. In this document, we have identified 30 of the highest-impact emerging technologies and technology trends (see Figure 1), organized around four key themes, which are critical for product leaders to evaluate as part of their competitive strategy.

This radar summarizes (but is not limited to) the technologies and trends found in this year's body of Impact Radar research and most closely aligned with (or most influential to) the four themes:
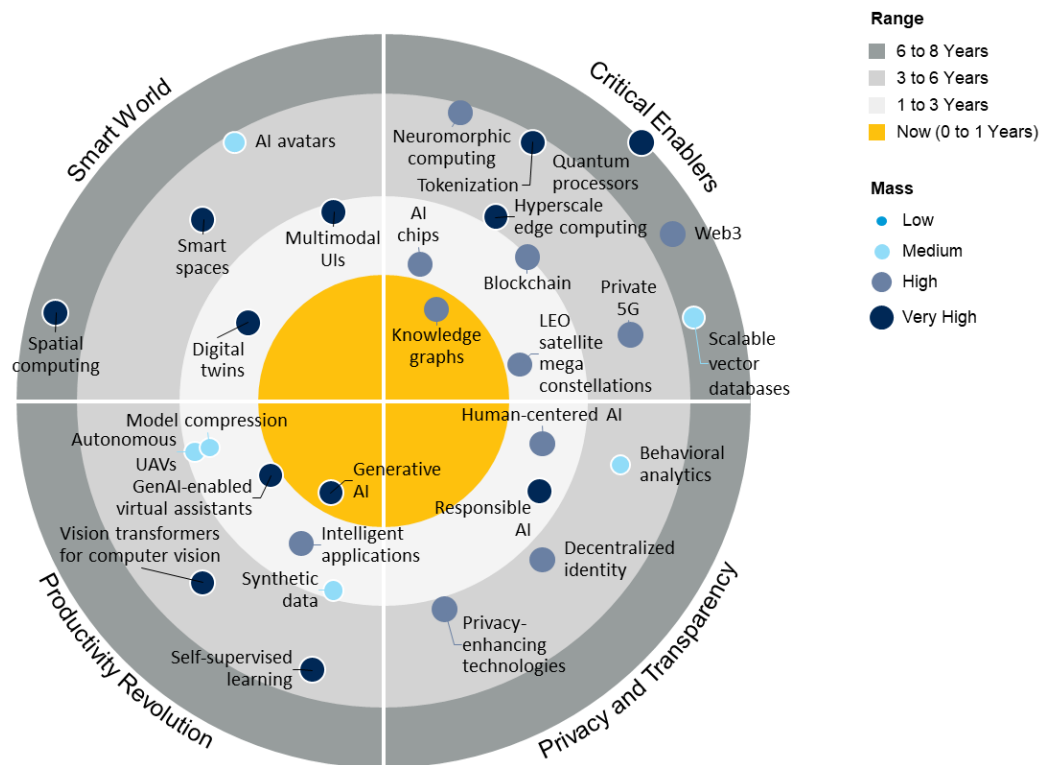
- Smart world

- Productivity revolution

- Privacy and transparency

- Critical enablers

The Impact Radar

Figure 1 shows the highest-impact emerging technologies and trends based on time to adoption.

Figure 1: Impact Radar for 2024

Impact Radar for 2024

Source: Gartner (January 2024)
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Product leaders should use the Radar Profile range to plan investment timing in the related emerging technology or technology trend. Range represents Gartner's estimate of time to reach early majority (more than 16% target market adoption), <u>not</u> when product leaders should act on investment. Considering time to plan, develop and launch, a starter guide to product leader investment timing, based on product strategy, is:

■ *First movers should be acting now on items in the 6-to-8-years ring (or beyond).*

■ *Fast followers should be acting now on ETTs in the 3-to-6-years ring.*

- *Majority followers should be acting on ETTs in the Now and 1-to-3-years rings.*

- *Laggard followers can wait until the ETT has passed through to early, or even late, majority.*

The objective of this research is to guide product leaders on how emerging technologies and trends are evolving and impacting areas of interest. Providers can leverage this knowledge to determine which technologies or trends are most important to the success of their business and when it makes sense to advance their products and services by investing in them. Refer to the How to Use the Impact Radar section for more information.

Emerging Technologies or Trend Profiles

Table 1 lists emerging technologies in 2024 according to their time to adoption. Click on a technology name in the table to jump to a profile of the technology.

Table 1: Most Impactful Emerging Technologies and Trends in 2024 Based on Time to Adoption

Now	1 to 3 years	3 to 6 years	6 to 8 years
Generative AI	AI chips	AI avatars	Quantum processors
Knowledge graphs	Autonomous UAVs	Behavioral analytics	Scalable vector databases
	Digital twins	Blockchain	Self-supervised learning
	GenAI-enabled virtual assistants	Decentralized identity	Spatial computing
	Human-centered AI	Hyperscale edge computing	Web3
	Intelligent applications	Neuromorphic computing	
	LEO satellite mega constellations	Privacy-enhancing technologies	
	Model compression	Private 5G	
	Multimodal UIs	Smart spaces	
	Responsible AI	Tokenization	
	Synthetic data	Vision transformers for computer vision	

Source: Gartner (January 2024)

The technology profiles in Table 1 are alphabetized. For an explanation of Gartner's methodology for assessing Impact Radar technologies, see Note 1.

In addition to the technologies in Table 1, product leaders should track longer-range trends (in this case, metaverse in the Emerging Technologies and Trends Watchlist) and be prepared to make early investments in order to be ready to utilize them when they come to maturity.

The Four Key Themes

The Smart World Transforms Interactions

As online and offline experiences converge (spatial computing), how we interact with people, places, content and things will also change. Similar to analog interactions, multimodal interfaces involve different inputs (spoken or written language, brain and muscle signal control, motion and gesture, facial expression or eye gaze movements, or touch) depending on the use case. For example, a human-like virtual persona can be created using computer-generated imagery (AI avatar) for customer care, or as a brand representative. Such interactions can be further personalized with a digital twin mirroring a unique individual to anticipate behaviors to address use cases such as patient healthcare, finance and commercial services, and government and social services. Product leaders have an opportunity to differentiate the customer experience aspect of their offering via the optimal combination of interfaces and experiences. For the majority of providers, this means working within an ecosystem of partners to deliver the types and combinations of interactions desired.

AI-Enabled Applications Will Spur a Productivity Revolution, Largely Driven by Generative AI

Advances in AI technologies (and specifically GenAI) over the past year have augmented the productivity potential of AI-enabled applications. In 2023, generative AI became a popular technology embedded into virtual assistants, enterprise applications, search engines and computer vision solutions. This is resulting in improvements in existing features and adding new functionality and automation potential to existing applications. The productivity potential of generative AI is what is largely driving its widespread adoption across the enterprise.

AI is also scaling across existing endpoints and being applied to new endpoints, such as cameras, unmanned aerial vehicles (UAVs), IoT devices and satellites. Advances in AI techniques, such as self-supervised learning, synthetic data and model compression, are helping organizations overcome data accessibility and hardware constraints. This is supporting broader AI deployment and utilization across additional use cases.

Privacy and Transparency Will Be the Gating Factors for Technology Adoption

As assets, information and experiences become increasingly digitized and the variety of endpoints expands, so do the opportunities for bad agents to mimic, disrupt and intercept our activities. Systems using decentralized identity can be applied to help mitigate security and privacy concerns that arise from storing data in a traditional centralized repository. Furthermore, these systems offer a reusable and portable identity and potentially allow users more control over their identity and associated data. Trusted users can be identified using behavioral analytics to develop behavioral profiles (such as time of day, location, access modality, journey pace and other metadata derived from historic user interactions) based on user interactions rather than with a device.

The risk of regulatory and legislative action also increases as AI tools and techniques are applied to more and more products and use cases. To head off these concerns (which threaten to limit growth and adoption), product leaders will need to ensure that the right business and ethical choices are made in the adoption of AI (via responsible AI or privacy-enhancing technologies or techniques) as well as using AI design principles that will benefit people and society (human-centered AI).

Unlock Full Potential of Tech Solutions With Advancements in Critical Enabling Technologies

Web3 technologies, including Blockchain and tokenization, have entered a "winterization," with slowing investment and adoption. This is due to many business and technology maturity challenges, with Web3 technologies struggling to deliver business value. As the market consolidates and matures, the offerings and use cases that effectively utilize blockchain technology to solve business problems will stand, while those built on hype will fail.

Knowledge graphs and scalable vector databases are key software enablers. These technologies are supporting generative AI adoption by improving the explainability and utility of LLM implementations within the organization. Investment in these technologies will be important for GenAI adoption.

Advances in AI hardware (such as AI chips, neuromorphic computing and quantum processing) are and will continue supporting the deployment of AI solutions on more embedded edges, as well as supporting more complex AI applications to run outside of the cloud. Meanwhile, innovation in communications technologies (such as private 5G and LEO satellite constellations) are improving communications services for consumers and businesses alike by providing ubiquitous connectivity and supporting remote operations.

Computer vision and edge AI have moved off the Impact Radar because they have crossed the chasm (reached 16% adoption) . Advancements continue to push the innovation envelope. Therefore, we have dedicated the following Impact Radars (see Emerging Tech Impact Radar: Edge Artificial Intelligence and Emerging Tech Impact Radar: Computer Vision) to evaluate further advancements in both these technologies.

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