

CIOs' Guide to Assessing Emerging Technology Adoption Readiness

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Initiatives: [CIO Leadership of Innovation, Disruptive Trends and Emerging Practices](#)

To drive technology-enabled business strategies, innovative CIOs must balance the risks and opportunities presented by emerging technologies. Clear assessments of these technologies' maturity and readiness for deployment is crucial to maximize the benefits and minimize the risks of early adoption.

Overview

Key Findings

- Organizations striving to gain competitive advantage through the early adoption of emerging technologies often find it difficult to determine which opportunities to pursue.
- CIOs are concerned that unproven technologies present greater risk/return profiles than other types of investments and look to minimize the risks of early adoption.
- Organizations lack a structured process that assesses emerging technologies and maintains a portfolio of opportunities to track emerging technology into the future.
- To support technology innovation, many organizations must overcome nontechnical barriers (e.g., culture, leadership, financial).

Recommendations

CIOs considering investments in emerging technologies must:

- Adopt a structured and transparent approach that identifies appropriate use cases for exploiting emerging technologies in their organizations.
- Establish processes that analyze the constraints of technical feasibility, organizational readiness and external factors to determine the trigger point before approving investment in a proof of concept for an emerging technology.

- Institute opportunity identification mechanisms to fully analyze and track a portfolio of innovation opportunities that will exploit emerging technologies into the future.
- Champion efforts to overcome organizational readiness constraints by working with other executives to resolve cultural, leadership, financial and ethical constraints.

Analysis

Many organizations aspire to be early adopters of emerging technologies, but are held back by a lack of understanding of the adoption constraints before a technology is thoroughly proved. Although the risks are real, careful analysis can identify constraints that minimize the risks of early adoption and maximize the opportunities to gain competitive advantage. In this research, we present a structured analysis method for determining the maturity of emerging technologies, anticipating adoption readiness in your organization and enumerating the environmental factors that must be considered.

Use a Structured Approach to Identify Use Cases for Emerging Technologies

Emerging technologies are the source of many of the innovation opportunities that drive new processes, products or even business models. Evaluating emerging technologies is a bottom-up innovation approach that explores “the realm of the possible” to identify opportunities that may not have been anticipated. This is in contrast with a top-down strategy approach, in which a need is known and a solution is found and implemented. A bottom-up approach drives technology-enabled business strategies and must complement (rather than replace) top-down, strategy-driven innovation approaches.

Trendspotting starts with a broad view and narrows the spectrum of technologies and opportunities to a set of innovation opportunities for the organization to consider (see [Use a Trendspotting Method to Identify the Technology Trends You Need to Track](#)).

Increasingly, organizations are developing innovation ecosystems to take an “outward-in” view of innovation (see [Reimagine Innovation With an Adaptive Innovation Ecosystem Framework](#).) Once an innovation opportunity has been identified, closer analysis is required to anticipate the appropriate point in time to launch a proof of concept (POC). Innovation opportunities can then be tracked on an opportunity radar, and managed in an innovation portfolio.

Regardless of how you identify an innovation opportunity (i.e., a top-down or bottom-up or outward-in approach), technology innovation (TI) is characterized by uncertainty, complexity and risk. The adoption of innovative technologies is constrained by a number of technological, organizational and environmental obstacles. Some of these constraints are critical, and must be resolved before a TI becomes viable. Other important constraints must be overcome, because they represent real risks to successful adoption; other constraints may be manageable.

The impact can be assessed as follows:

- **Critical Constraints** — These constraints are “showstoppers,” causing the deferral of any POC initiative until the criteria are met.
- **Important Constraints** — These constraints present high risks that may not be resolved, causing failure in the POC phase.
- **Manageable Constraints** — These constraints present manageable risks that can be resolved in the POC phase.

This research details the common constraints that determine the trigger point for adopting an emerging technology. Adoption readiness is more than a technology meeting the functional requirements for the proposed use case. It includes organizational readiness and external factors that must be considered. This research focuses specifically on the readiness for deployment, rather than the benefits of deployment. Of course, a clear understanding of the benefits of any TI opportunity is critically important. This topic is covered in other Gartner research (see [Use an Idea Evaluation Canvas for Innovation Experimentation](#)).

The Importance of Identifying Use Cases and Business Scenarios

Technologies often have multiple, specific use cases that mature at different rates. Gartner has recently published a number of “use case prisms” that identify business value and feasibility for use cases for artificial intelligence (AI) in different industries and business units.¹ When evaluating emerging technologies, organizations must identify the specific use case that they are planning for to accurately determine the technology’s feasibility, the organization’s readiness for adoption and the external factors for deploying a technology in that use case.

Once the use case has been identified, it must be translated to a business scenario that describes the proposed change and its impact on business models, processes or products. The business scenario can then be evaluated in terms of the risks, costs and benefits for the organization.

Analyze the Constraints of Technical Feasibility, Organizational Readiness and External Factors

There are three sets of criteria and factors to consider when evaluating technology maturity (see Table 1):

- **Technological Feasibility** – Constraints relating to the technology itself
- **Organizational Readiness** – Constraints that identify barriers to the technology deployment within the organization
- **External Factors** – Constraints outside the control of the organization that may be obstacles to deployment

Table 1: Technology Adoption Constraints

<i>Technical Feasibility</i> ↓	<i>Organizational Readiness</i>	↓	<i>External Factors</i> ↓
Functional Requirements	Culture		Regulation and Standards
Nonfunctional Requirements	Leadership		Social Acceptance
Enabling Technologies	Financial		Critical Mass
Architecture Alignment	Skills		
Cost/Performance	Ethics		

Source: Gartner (August 2021)

These are the most common constraints that need to be considered when deploying an emerging technology. Consider the unique constraints that could be added to this list for the particular emerging technology you are considering. These common constraints are described as follows.

Technical Feasibility

- **Functional Requirements:** The specific use-case requirements with metrics for success. To describe the functional requirements, you must identify the specific use case and the business scenario to determine the success metrics.
- **Nonfunctional Requirements:** The technology attributes that are required for deployment, but are not part of the core capabilities. There are a broad range of nonfunctional requirements, such as security, data privacy and vendor viability.
- **Enabling Technologies and Infrastructure:** The technology dependencies for the proposed emerging technology in deployment. For example, when deploying electric vehicles, the required charging infrastructure must be in place.
- **Architectural Alignment:** How the technology fits into the current architecture and aligns with the future architecture vision for the organization. Although architectural alignment may not always be possible, it is certainly desirable and must be considered.
- **Cost/Performance:** The cost/performance effectiveness of a technology in the specific use-case scenario. Technology costs decrease and performance increases over time. An emerging technology use case may not meet cost/performance requirements today, but will sometime in the future.

Organizational Readiness

Organizational readiness and the related constraints are often endemic to the organization, although there may be variances across business units. Many of the organizational readiness factors are outside the IT organization — CIOs need to work with executive leaders to resolve them. (For advice on influencing executive leaders to support innovation, see [Foster a Culture of Innovation Using a Two-Layered Roadmap](#) and [How to Influence the Innovation Climate in the Organization](#).)

- **Culture:** In Gartner's Technology Innovation Strategy Survey, 75% of respondents cited a culture that lacks support for TI as limiting innovation success.² The belief that innovation is simply not part of the organization's DNA is often pervasive.

- **Leadership:** CIOs and IT leaders often appear to prioritize TI; however, leadership constrains innovation in many organizations. Common leadership constraints to TI include prioritizing immediate goals and a lack of business champions.
- **Financial:** The 2021 Gartner View From the Board of Directors Survey indicates that, as a result of COVID-19, 67% of boards of directors (BoDs) expect budgetary increases in IT/technology in 2020. ³ Financial constraints, such as insufficient budget allocation for digital innovation, remain.
- **Skills:** Technology-enabled innovation often requires skills that are in high demand. Skills deficiencies on the innovation team must be developed. Specialized technical skills can often be sourced from external service providers (ESPs) on a project basis.
- **Ethics:** TI is moving faster than governments can regulate. Reliance on self-regulation has led to ethical issues for many organizations, which can damage their reputations.

External Feasibility

- **Regulation and Standards:** Regulators often fall behind the pace of TI, producing significant gaps between technology capabilities and regulatory constraints. Regulation must be in place to address privacy, safety, ethical and competitive concerns. Organizations must not only consider regulations prohibiting the use of technologies, they must also anticipate the potential regulatory constraints in the future.
- **Social Acceptance:** Social acceptance of emerging technologies is often an afterthought for TI leaders, but social acceptance can be a significant constraint to the successful adoption of technologies. A good understanding of perceived benefits and risks, knowledge and attitudes toward an emerging technology can mitigate some of the risk of a technology being rejected.
- **Critical Mass:** Some (but not all) emerging technologies are subject to the effects of critical mass and network effect. Three different types of technologies are strongly influenced by critical mass: communication and collaboration technologies, technology platforms, and standards-based technologies.

Assess Emerging Technology Adoption Opportunities

Once a use case and a business scenario have been identified, CIOs and TI leaders must evaluate the business scenario against the criteria and factors listed previously. They should also consider other constraints that may be unique to the technology or business scenario to assess the readiness to move forward with a POC for the business scenario.

Using Table 2, assess each of the constraints to determine the impact of not achieving a satisfactory level of performance. For simplicity, the level of performance is binary — satisfactory or unsatisfactory. The impact can be assessed as follows:

- **Critical Constraints** — These constraints are “showstoppers,” which delay POC initiatives until the criteria are met.
- **Important Constraints** — These constraints present high risks that may not be resolved, causing failure in the POC phase.
- **Manageable Constraints** — These constraints present manageable risks that can be resolved in the POC phase.

Table 2: Emerging Technology Adoption Assessment

(Enlarged table in Appendix)

	Constraint Impact	Meets Requirements?	Years to Meet Requirements	Critical Constraints	Risk Exposure
Years to Feasibility				4	
Technological Feasibility					
Functional Requirements	Critical	No	2	2	Defer
Nonfunctional Requirements	None	Yes			
Enabling Technologies	Important	No	3		High
Architectural Alignment	None	Yes			
Cost/Performance	Critical	No	3	3	Defer
Organizational Readiness					
Culture	Critical	No	2	2	Defer
Leadership	None	Yes			
Financial	Manageable	No	1		Moderate
Skills	None	Yes			
Ethics	None	Yes			
External Factors					
Regulation and Standards	Critical	No	4	4	Defer
Social Acceptance	None	Yes			
Critical Mass	Manageable	No	2		Moderate

Source: Gartner (August 2021)

Evidence

¹ See [Infographic: Artificial Intelligence Use Case Prism for the P&C and Life Insurance Industry](#)

² Gartner's Technology Innovation Strategy Survey was conducted online from September 2018 to February 2019, with 273 innovation leaders in the U.S. and the U.K. Study participants led innovation programs directly or had direct knowledge and involvement with their organizations' innovation initiatives and strategies. The survey covered end-user organizations with revenue of at least \$250 million, and the majority of respondents were at organizations with worldwide annual revenue of more than \$1 billion.

Our survey covered a wide range of industries, with manufacturing, retail and financial services in the lead. However, the broad range of industries means there were relatively few respondents from some industries, so, in some cases, we're unable to provide a statistically significant breakdown by industry.

Respondents were drawn from a broad range of departments in the organization, the top three being IT strategy and architecture, the innovation group, and corporate strategy. Typical job titles included CIO, IT director, CTO, director, chief innovation officer and a range of VP roles.

The 2021 Gartner View From the Board of Directors Survey: This survey was conducted to find out how BoDs view digital-business-driven business model evolution and its impacts on their enterprises. It also helps understand the BoDs' expectations of executive leaders and how BoDs translate their board focus to actual executive actions and overall corporate performance.

The survey was conducted online from May 2020 through June 2020, among 265 respondents from the U.S., Europe and the Asia/Pacific (APAC) region. Companies were screened to be midsize, large or global enterprises.

Respondents were required to be a board director or a member of a corporate BoD. If respondents serve on multiple boards, they answered for the largest company, defined by its annual revenue, for which they are a board member.

The survey was developed collaboratively by Gartner analysts and the Research Data and Analytics (RDA) team.

Disclaimer: The results of this survey do not represent global findings or the market as a whole; rather, they reflect the sentiments of the respondents and companies surveyed.

Recommended by the Authors

[Innovation Idea Selection — Choosing for Success](#)

[Use an Idea Evaluation Canvas for Innovation Experimentation](#)

[Inventing the Future With Continuous Foresight](#)

[Hype Cycle for Emerging Technologies, 2020](#)

[Toolkit: How to Create an Emerging Technology Wheel](#)

[Successful Innovation Strategies Look Beyond Culture by Treating Organizations as a Persona](#)

[Eliminate the Barriers That Inhibit Innovation](#)

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