

McKinsey Explainers

What are the responsibilities of a CIO versus a CTO?

Broadly speaking, a chief information officer focuses on internal technology, while a chief technology officer focuses on emerging technologies and product strategy.



Technological advances are shifting the ground beneath our feet. Nothing is safe from the rapid pace of change: products, services, business models, and the way we work have all changed over the past years, and are likely to change again. What's more, the pace of change is likely to keep accelerating as the years go on.

These changes can be exciting if you're working with an [agile](#) mindset—but they can also be scary. We've seen many examples of technological disruptions rendering entire business models obsolete in a matter of months. Organizations that fail to stay on top of such disruptions risk the value their stakeholders have worked so hard to create.

It's down to chief information officers (CIOs) and chief technology officers (CTOs) to make sure organizations stay technologically competitive. Organizations that build new technologies into their strategies and operating models [have greater success](#) than those that don't, McKinsey research shows.

These executives have similar responsibilities, but they're not the same. With the IT explosion in the 1990s and 2000s, the CTO role became intertwined with that of the CIO, who is generally more involved with the technologies supporting and facilitating information and knowledge management within a company than with those driving product strategy (exhibit).

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How is the CTO role evolving?

Not every leader within an organization needs to “understand technology” in the same way. But there should be someone in the C-suite—the CTO—who

is responsible for knowing which new, potentially disruptive technologies are surfacing, to grasp both the dangers and opportunities they pose for the organization, and to see and act across the company to help formulate and execute a holistic response.

Traditionally, the CTO provided a single “buck stops here” point of view on technology trends, policies, and procedures critical to developing or enhancing a company's products and services. As technology has advanced, the [CTO role has changed](#) to keep pace.

Technology can describe everything from materials science to the deployment of robotics in internal processes to the latest “everything as a service” models. Digitization now permeates all aspects of so many businesses, making it hard to draw a line around what a CTO's areas of responsibility should be. The difference between a CTO and other C-suite tech roles is that a CTO should be equally concerned with product and technology development. Other C-suite digital roles tend to be more oriented toward business models and digital products and are more internally focused than a CTO.

How can CTOs set themselves up for success?

The most effective CTOs nurture personal qualities that enable them to turn technological opportunities into sustainable successes. These are:

- A deep understanding of customers and fluency in [design thinking](#). For B2B companies, a CTO should work to cultivate a reputation and networks in the customer space.

- A deep understanding of the company's current technology.
- The curiosity to learn about new technologies in development.
- The acuity to see the implications and possible uses of new technologies.
- The capacity to cultivate external networks, including with universities, start-ups, and venture capital.

- A mastery of systems engineering.
- A willingness to challenge the status quo.

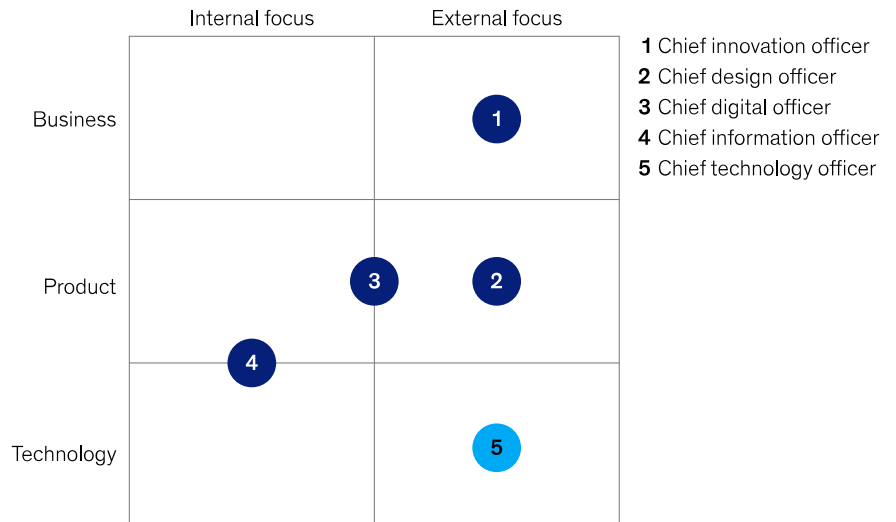
But it's not just personal qualities that make for successful CTOs. The role itself should be specifically configured to cater to a combination of the needs of the organization and the strengths of the individual.

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Exhibit 1

The chief technology officer's position is distinct from other C-suite roles.

Focus areas of C-suite roles



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What are four typical CTO styles?

There are at least [four distinct potential styles](#) CTOs can adopt depending on their position and profile:

1. The *challenger* thrives in a high-control, low-resource environment. They use creative tension and veto power to improve research and development performance by injecting scrutiny, external perspectives, and rigor into activities and processes owned by business units. The challenger's job description focuses on external interfaces and strategy and portfolio management.
2. The *owner* thrives in a high-control, high-resource environment. They centralize all research and development personnel and budgets under their control, which gives them complete ownership of product and technology development in the company. The owner's job description focuses on strategy and portfolio management and process and personnel management.
3. The *influencer* thrives in a low-control, low-resource environment. They act as a sounding board, counseling business leaders on research and development programs and campaigning throughout the business to garner resources for top-priority ideas. The influencer's job description focuses on internal and external interfaces.
4. The *enabler* thrives in a low-control, high-resource environment. They focus on making the resource and development function faster and more effective by improving processes, cross-pollinating ideas, and improving skill levels—or by increasing investment in a few critical projects. The enabler's job description focuses on capability building, internal interfaces, and process and personnel management.

Which style suits which company best is informed by the company's industry. In general, firms in less technology-intensive industries are good places for influencers and enablers. Influencers, often found in consumer goods companies, for example, are deep thinkers who advocate for innovation through partnerships with providers of new technologies. Enablers are more managerial, tasked with driving efficiencies in multi-business-unit organizations with lots of overlap in technologies and projects among business units.

By contrast, challengers and owners tend to thrive in more technology-intensive companies that spend a lot on research and development. Challengers do best in companies with multiple business units, where the need is to prevent business units from becoming complacent. Owners, for their part, are often found in single-product companies, where one person can keep everything in their head.

How is the CIO role evolving?

CIOs have typically managed everything related to information and communication technology. This includes policy and practice development, planning, budgeting, resourcing, and training. But in today's [agile](#) organizations, the requirements of the top information officer are a bit different. CIOs today establish the system and infrastructure for people to do their jobs effectively in an agile organization. They are not glorified IT managers; instead, they are product visionaries, defining and driving strategic technology initiatives.

For IT to become a driver of value, CIOs should inhabit [five roles](#):

- *Business leader*. A transformative CIO understands the business inside and out. We've found that the best CIOs go beyond just meeting with the C-suite. They also invest time with functional and business unit leaders to

understand the realities on the ground. Transformative CIOs also take responsibility for initiatives that generate revenue. This allows CIOs to build understanding of the business implications of technology.

- *Change agent.* A transformative CIO mindset is one that acknowledges the need for change over several years. To inhabit this role, CIOs should partner with business leaders across the organization. These relationships should be based on shared goals, mutual responsibility, and accountability. The CIO also needs to have a clearly articulated “why” to support transformations, as well as clearly defined links to business growth.
- *Talent scout.* Skill gaps are consistently cited as a top obstacle to digital transformation. CIOs should focus on not only recruiting top people but also retaining them. Two solutions have proven effective: reimagining how to attract tech stars and building up internal talent.
- *Culture revolutionary.* It’s up to the CIO to nurture a culture that supports talent. People want to be well paid, of course, but they also want to feel valued. For engineers, this can mean reducing bureaucratic processes and creating ways for cohorts of similar skill sets to get together. Transformation also requires a culture of collaboration—across technology teams and between the business and technology sides.
- *Tech translator.* Finally, CIOs need to translate technology to leaders. The business implications of tech decisions should be clear—and it’s up to the CIO to articulate them.

Learn more about [McKinsey Digital](#).

How can CEOs and board members support CIOs?

Based on nearly 150 interviews with senior tech leaders and business executives, we isolated five ways CEOs and board members can [support their tech leaders](#):

- *Ensure a long-term mandate and support.* Modernizing IT is a critical component of any successful [digital transformation](#). But many executives balk at the time and resource investment required to truly accomplish it. CIOs need to articulate not only how IT generates value but what the timelines are for doing so. Big payoffs often take two years or more.
- *Align on principles.* Without clear alignment, IT is often stretched thin as different parts of the organization make different demands for IT support. As a result, the CIO has to expend resources across many often-unconnected initiatives, which makes it difficult to invest in larger, cross-functional efforts that ultimately benefit the organization overall. The board and CEO can help by explicitly aligning on strategic business goals, allowing the CIO to prioritize the right initiatives.
- *Make the business a magnet for tech talent.* People and talent strategies are among the highest-value moves a business can make—yet talent strategy ranks toward the bottom of initiatives companies pursue. When it comes to tech talent, boards and CEOs can play a role in attracting and retaining people by supporting an engineering culture where people have not just the freedom, but the expectation, to innovate.

- *Understand tech implications.* Boards and CEOs generally have a good sense of complex issues related to supply chain and operations—but that level of insight often does not extend to IT. To get better guidance from their boards and CEOs, CIOs can provide a clear view of how efficient their IT actually is through an independently vetted evaluation. Boards can then thoughtfully challenge their CIOs to drive tech improvements that matter to the business.
- *Build up technical literacy.* Technical literacy at the CEO and board level is a strong driver of transformational success. With sufficient tech literacy, boards and CEOs can become effective challenge partners who recognize the need to invest in IT by hiring talent, providing budgets, and focusing resources to build up digital capabilities. Tech literacy in this context means a baseline understanding of the ways tech can drive value and which hurdles to navigate first.

These approaches probably don't come as a surprise to business leaders. But too often, boards and CEOs struggle to provide CIOs with these basics. And CIOs themselves struggle with how to address issues that arise.

How can CTOs and CIOs reckon with emerging generative AI technology?

Generative AI (gen AI) is big news. McKinsey research estimates that gen AI could add the equivalent of [up to \\$4.4 trillion](#) of value annually. For CIOs and CTOs, the gen AI boom represents a unique opportunity to apply those lessons to guide the C-suite in turning the promise of gen AI into sustainable value for the business.

Through dozens of conversations with tech leaders at more than 50 companies, we've identified [nine actions](#) all technology leaders can take to create value, orchestrate technology and data, scale solutions, and manage risk for gen AI. They are:

1. Move quickly to determine the company's posture for the adoption of gen AI.
2. Identify use cases that build value through improved productivity, growth, and new business models.
3. Reimagine the technology function, focusing on quickly building gen AI capabilities in software development and reducing manual effort in IT operations.
4. Take advantage of existing services or adapt open-source gen AI models.

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5. Upgrade your enterprise technology architecture to integrate and manage gen AI models.
6. Develop a data architecture to enable access to quality data by processing both structured and unstructured data sources.
7. Create a centralized, cross-functional gen AI platform team to provide approved models to product and application teams on demand.
8. Invest in upskilling key roles, but tailor the training program by roles and proficiency levels.
9. Evaluate the new risk landscape and establish ongoing mitigation practices.

The space will continue to evolve rapidly. But these nine actions can help tech leaders avoid unnecessary—and potentially costly—delays in defining and shaping a gen AI strategy.

Learn more about [McKinsey Digital](#). And learn more about [technology-related job opportunities](#) if you're interested in working at McKinsey.

Articles referenced:

- [“Technology’s generational moment with generative AI: A CIO and CTO guide,”](#) July 11, 2023, [Aamer Baig](#), [Sven Blumberg](#), Eva Li, Douglas Merrill, Adi Pradhan, Megha Sinha, [Alexander Sukharevsky](#), and Stephen Xu
- [“CIO perspectives on leading agile change,”](#) January 24, 2022, [Jason Inacio](#), Dávid Kincsem, Guilherme Riederer, and [Dániel Róna](#)
- [“What CIOs need from their CEOs and boards to make IT digital ready,”](#) December 1, 2021, [Thomas Elsner](#), Peter Maier, [Gérard Richter](#), and Katja Zolper
- [“The CIO agenda for the next 12 months: Six make-or-break priorities,”](#) November 1, 2021, [Aamer Baig](#)
- [“The CIO challenge: Modern business needs a new kind of tech leader,”](#) January 27, 2020, [Anusha Dhasarathy](#), Isha Gill, and [Naufal Khan](#)
- [“How to become an agile CIO,”](#) September 6, 2018, [Santiago Comella-Dorda](#), Quentin Jadoul, and Swati Lohiya
- [“Why you need a CTO—and how to make her successful,”](#) January 31, 2018, [Kimberly Borden](#), [Shivanshu Gupta](#), Florian Weig, and Jim Williams

Get to know and directly engage with senior McKinsey experts on the roles of CIO and CTO

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