



The dual roles of the CIO in the digital age

THE rapid adoption of digital technologies is putting new pressures on IT organizations. As spending on cloud, mobile, analytics, and social technology soars, CIOs have the opportunity to help drive strategy, innovation, and revenue growth. At the same time, these technologies present major new challenges in the traditional domain of IT: building and integrating information systems while cost-effectively operating a reliable and secure infrastructure. Today's CIO must play a dual role: builder of technology and builder of the business.

Signals

- The cloud services market is expanding 5 times faster than traditional IT spending
- Enterprises spent over \$30 billion globally on big data technology and services in 2013
- Leading CIOs describe their roles in terms such as “imagination,” “chief innovation officer,” and “revenue-generator CIO”
- Seventy percent of CIOs envision becoming CEO one day

- Half of CIOs feel unable to cope with the pace of change brought by digital technologies

Enterprise IT is being transformed by digital technologies

IT organizations are changing. Previously focused mostly on building and operating IT infrastructure and automating business processes, CIOs are now looking for new ways to bring value to their businesses. Today's IT organization is increasingly focused on revenue growth, customer experience, and data-based insight.

This shift is due to the growing importance of "digitization"—the use of digital technologies to enhance productivity and responsiveness, uncover insights about customers, innovate, and create new business models. The media, marketing, and retail commerce sectors adopted digitization early, and they continue to invest and innovate. The digitization trend can now be seen in virtually every sector. For instance, the digital oil field employs analytics and mobile devices to make exploration and production more productive. Digital manufacturing uses digital modeling and simulation to reduce cycle times and costs. In "smart" buildings, digital sensors help improve energy efficiency. Financial services firms reduce costs and improve risk management by digitizing processes from end to end. In health care, mobile devices and analytics are improving diagnoses and health outcomes and helping to contain costs. And e-government initiatives are using the Web, big data, mobile devices, and sensors to improve public safety and serve citizens better.

The digitization trend is supported by the ongoing decline in the prices of connectivity and computing power and the growing consumer adoption of digital technologies such as social and mobile. From 2011 to 2013, for instance, the number of smartphone wireless subscriptions in the United States surged

70 percent to 200 million; average monthly mobile data usage per person increased 80 percent during the same period.¹

Flourishing markets for digital technologies are impacting enterprises

The flourishing markets for cloud, mobile, analytics, and social technologies and services are a measure of their growing impact on enterprises:

- The cloud services market is expanding almost five times faster than traditional IT spending is.²
- The number of mobile devices and wireless connections in 2013 grew to 7 billion globally, an increase of 500 million in one year.³
- Enterprises spent over \$30 billion globally on big data hardware, software, and services in 2013, 25 percent more than in 2011.⁴
- Advertisers increased spending on social media advertising by 60 percent between 2011 and 2013 to \$6 billion.⁵

It is important to keep the impact of digitization in perspective. Cloud services, for instance, still account for less than 10 percent of the IT services market.⁶ Legacy applications and infrastructure are not going away. CIOs will have to manage, maintain, and integrate them for years to come while guiding decisions about what to move to the cloud and what to keep on premises.⁷

CIOs aspire to foster innovation and drive growth

The power of digital technologies is leading CIOs to take a more expansive view of their roles. No longer is their job merely to build and operate the technology their business needs to function. Increasingly, they see their

Figure 1. The emerging values of enterprise IT

Issue	Traditional IT	Emerging IT
Key skills	Operations management Custom software development Packaged software deployment	Advising and guiding business leaders; strategy Innovation Technology orchestration and vendor management
Key metrics	Cost Uptime Performance	Business growth Customer experience/engagement Cost
Purview	Company facilities	Every employee, customer, and partner touchpoint
Risk posture	Minimizing risk	Managing risk to an appropriate level
Security orientation	Protection and defense	Discovery and response
Core value	Stability	Agility
Goal of outsourcing	Cost reduction	Increasing speed, filling skill gaps, managing costs (e.g., opex vs. capex)

role as helping to increase revenue, improve customer experience, coax insight out of the growing amount of data generated by companies’ digital operations, and shape strategy. If it sounds like CIOs are aiming high, they are. Seventy percent of the CIOs attending a recent Wall Street Journal CIO Network event see in themselves a future CEO.⁸ Figure 1 contrasts the traditional values of IT with the new values that are emerging in IT organizations today.

A look at what the CIOs of some of the leading organizations in the United States are saying and doing illustrates the changing mindset and priorities of CIOs.

The CIO of the **Coca-Cola Company** aspires to be what he calls a “revenue-generator CIO.” Coke is spending hundreds of millions of dollars a year on digital marketing, almost all of which is related to IT. The CIO says the marketing organization often turns to the IT organization for ideas about better ways to reach their customers.⁹

At **Dell**, the IT and marketing organizations share a team that reports to both the CMO and the CIO. Technology plans may be revised quarterly or even monthly in order to respond to the needs of the business.¹⁰

The CIO of **Walgreens** holds two additional CIO titles: chief *innovation* officer and chief

improvement officer. To foster innovation, he oversees a small group that is primarily responsible for discovering ways to use disruptive technologies that can yield major financial benefits, with an initial target of \$50 to \$100 million and an eventual goal of \$1 billion. He also has the more traditional responsibility of continually improving internal processes and finding cost efficiencies.¹¹

Purdue University’s CIO feels that that today’s CIO needs more than technical skill; he or she needs “imagination.” He says, “Imaginative people can envision where threats are coming from and where opportunities lie, as well as having the know-how to take advantage of these opportunities. That hasn’t been required of CIOs up until now.”¹²

Increasingly then, CIOs should play dual roles: builder of technology and builder of the business. Not all CIOs are able to or interested in playing the latter role, however. Some organizations are exploring creating a separate position, chief digital officer (CDO), for an individual who would define and execute a growth-oriented digital strategy. CDOs may become more common in the coming years. But as all business becomes digital business, firms may ultimately merge their separate CIO and CDO positions.¹³

Digital technologies are creating new challenges for IT leaders

While digital technologies are creating new expectations of CIOs, these technologies also create new problems. The traditional IT concerns of application integration, performance, cost management, and security now require new approaches. Many CIOs feel uneasy. According to a recent survey of 2,300 CIOs globally, half feel unable to cope with the pace of change wrought by digital technologies; over 40 percent feel that they don't have the talent they need.¹⁴

Digitization creates political and organizational challenges as well—a few of which are presented below.

Expanded role and relationships:

Increasingly, digital technologies are shaping and enabling corporate strategy. This thrusts CIOs into a strategic role, even as chief marketing officers, and in some cases chief digital officers, are playing in the same arena.¹⁵ Digital is also leading some firms to redesign core processes and operations, creating change-management challenges. CIOs should forge ever-closer and more productive relationships with C-level stakeholders while navigating potential conflicts and competition.

Legacy IT infrastructures: Enterprises implementing digital technologies often face requirements for scalability, high performance, and flexibility for which they are unprepared. Often this is because legacy IT infrastructures and applications are saddled with “technical debt”—an accumulation of code that never fully met requirements, was degraded by programmer shortcuts, or is excessively complex—that undermines agility and scalability.¹⁶

Architecture and integration: Companies adopting cloud computing face new questions about IT architecture: Which systems should be based in the cloud, and which should be operated on premises? When is a public cloud—in which physical computing resources

are shared with other enterprises—appropriate, and when is a private cloud—which provides cloud-style management efficiencies but is dedicated to a single enterprise—preferable? How can cloud-based and traditional in-house systems be integrated to create seamless, manageable solutions that provide predictable performance? The integration challenge is spawning dozens of start-up vendors in a rapidly growing and confusing market of “integration platform services.”¹⁷

Performance management: Cloud providers offer service-level agreements with performance guarantees. But many IT organizations are unaccustomed to monitoring and verifying the performance of resources outside their firewalls. It can be difficult to assure the experience of a user who is interacting with hybrid workflows that link processes operated by multiple cloud providers to internal applications. IT organizations may need to augment the services offered by a cloud provider to meet the service levels required by the business.

Cost management: Cloud pricing is often based on usage and varies with demand. One analyst firm has counted at least half a dozen ways of charging for cloud infrastructure.¹⁸ Variables such as resource contention and shifting requirements for storage, bandwidth, and redundancy can make it difficult to understand, predict, and manage the costs of cloud resources. Companies are finding that they need to continuously study and adjust the resources such as virtual machines, storage pools, and memory to optimize costs and avoid surprises.

Security: Companies face major challenges balancing security requirements with users' demand for an easy, attractive mobile experience, especially when mobile devices are becoming diverse and may run software of unknown origin alongside authorized enterprise applications. Cloud computing presents its own security challenges. Organizations

should allow their networks to connect with multiple cloud service providers' networks, opening new vectors and increasing the risk of cyber-attacks. Companies should ensure that public cloud providers will protect their data from other customers. And they should verify that providers' regulatory compliance and security governance satisfies their own standards.

A shortage of new skills: As with any new technology, the use of digital technologies requires a host of skills and knowledge that are in short supply. These include managing cloud vendors; architecting mobile and cloud security; and developing cloud applications, which require new tools and increasingly

use DevOps, an emerging software development methodology that stresses collaboration between software development and IT operations.¹⁹

Conclusion

In the digital era, CIOs have a great opportunity to influence the strategy and success of their organizations. They also face a host of new technological, political, and organizational challenges. Effective CIOs couple vision, creativity and political sensitivity with an ability to adroitly navigate a rapidly changing technology landscape.

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