Center for Technology and Innovation

I for innovation*

The next-generation CIO

Cover description: A drywall installer in southern California uses a novel alternative to scaffolding.

Cover image: Matt Schodorf, September 2008

Table of contents

October 2008

The heart of the matter

Expanding the I in CIO

Every chief information officer (CIO) knows that the job has become more complex. Before, technology was a back-office, data-processing activity. Now, it can be the foundation for the entire business. Today, the best CIOs not only keep the electronic plumbing in good repair, but also help define and execute forward-looking business strategies.

The changes of the past 20 years will seem mild compared with those of the next five. CIOs—and the senior executives they work with—will face unprecedented pressures, making success as a CIO even more difficult to achieve than it has been in the past.

The CIO's dilemma consists of two forces pushing the role and the business benefit in opposite directions. The first force is simplifying what used to be challenging. More and more technology becomes standardized, plug-and-play, and commonplace. Software as a service and cloud computing are demonstrating that technology infrastructure requires no expensive, dedicated set of resources to deliver or manage. Vendor consolidation and technology industry convergence confirm that core technologies are becoming commoditized—able to be handled by consultants, contractors, or even the vendors themselves. When most of an information technology (IT) group's effort is spent on integration and maintenance—upwards of 75 percent—it's just one more indication that the traditional enterprise IT we're familiar with is disappearing. In this world, a CIO is a vendor management officer, and most of the technology essentially takes care of itself. The CIO is dead.

The second force clears the path for more strategic value and promises more clout and responsibility than CIOs have ever had before. The best CIOs are beginning to act as chief innovation and process officers. This is because they're the only C-suite executives who have to know how the business actually works from one end to the other. This advantage gives them insight and leverage into making the business run better. *Digital company 2013*, the 2008 Economist Intelligence Unit's (EIU) study of 667 senior executives (which PricewaterhouseCoopers participated in) clearly shows CIOs' and executive management's desire for CIOs to take on greater strategic roles in areas such as customer-facing business initiatives—projects that CIOs aren't always accustomed to being part of. Long live the CIO!

An in-depth discussion

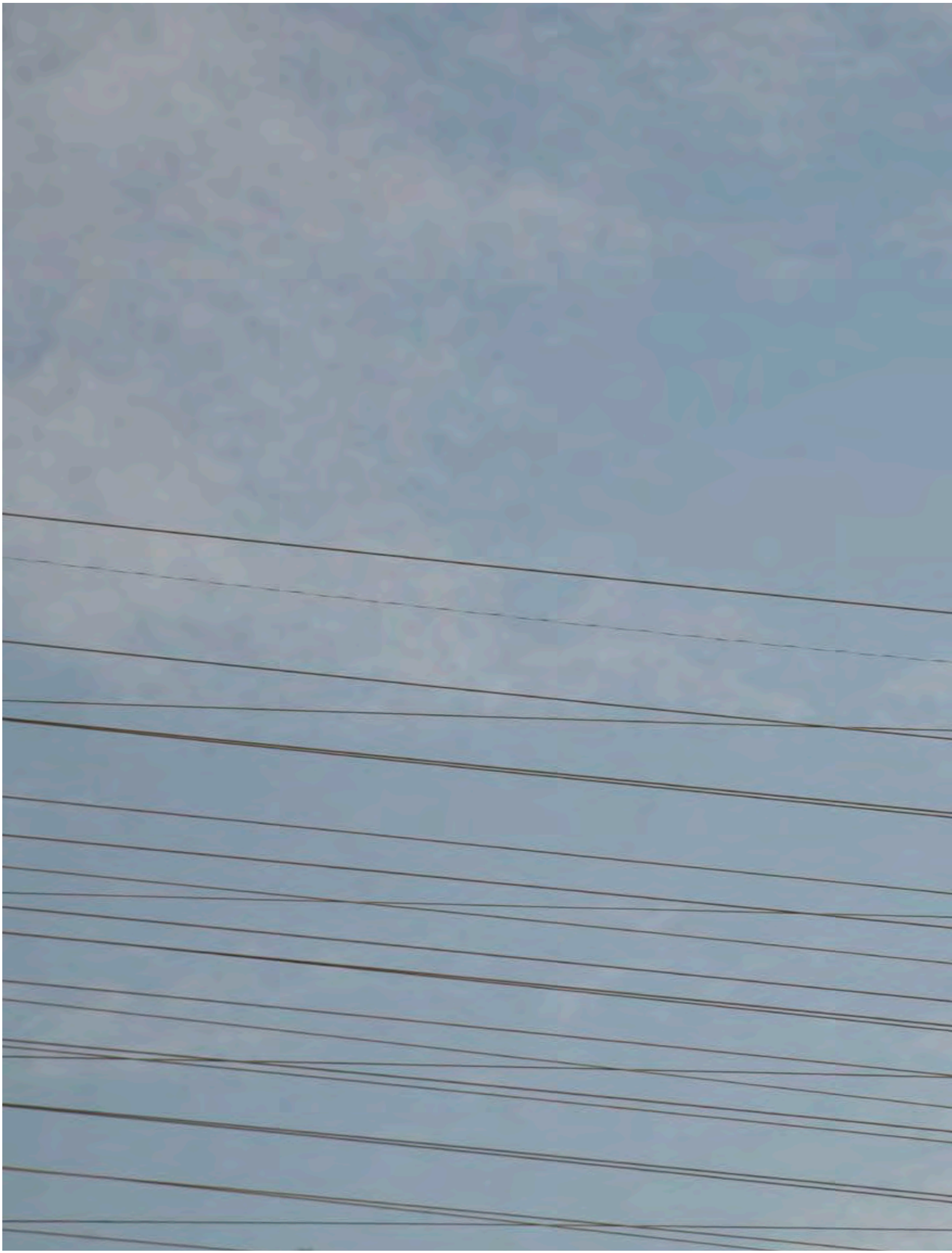
Two opposing forces: Generic IT and strategic value

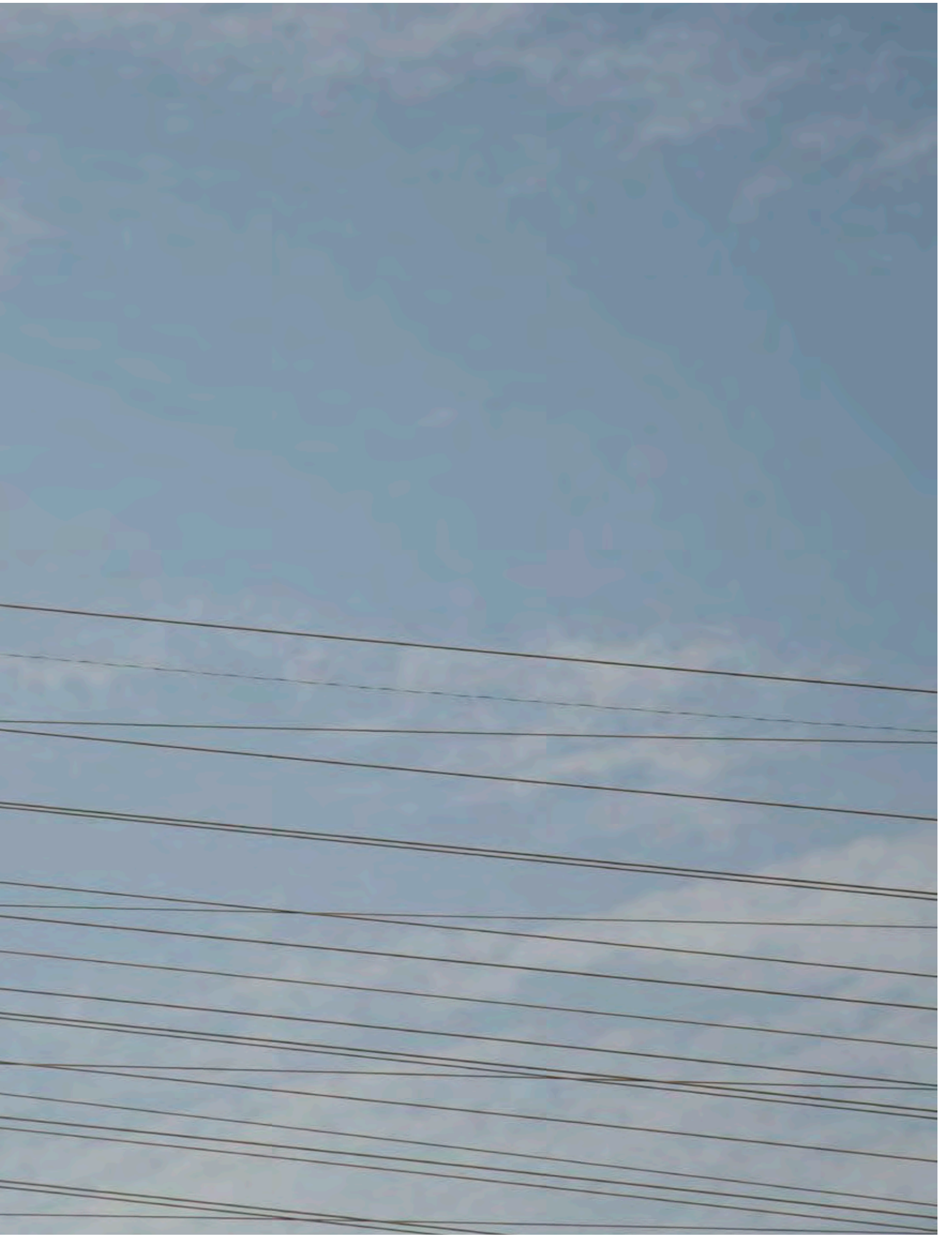
Although they push the CIO in two different directions, the two forces changing the role of the CIO—generic IT and strategic value—are linked. It's a link that savvy CIOs should recognize so they can ride the shifts those forces are creating. As infrastructure becomes more generic, the CIO gains more time to focus on the strategic goals of the company and to turn attention to a smaller set of technologies that provide real differentiation—the custom systems and software that make the fundamental business difference. The generic technologies can be delegated—or demand fewer resources—precisely because they are becoming generic.

During the next five years, these two forces will stir up some rough water. Some technologies will resist standardization, and different industries will have different mixes of generic and strategic technologies. Some trends, such as cloud computing, are extremely immature and likely to experience setbacks on the road to maturation, so CIOs can't depend on them despite the business pressures to do so. It will take insight, finesse, and character to manage this period of volatility.

This position paper explores these two forces and provides a framework for the design of a strategy to handle them. Every enterprise is different, so there is no one right strategy. But by understanding the forces themselves and their implications for the role of the CIO, an organization should be able to fashion an intelligent strategy.

IT in the sense of managing technology infrastructure is on the cusp of becoming a critical but nonstrategic asset like electricity.





Force I: Generic IT

In the May 2003 issue of *Harvard Business Review*, Massachusetts Institute of Technology (MIT) researcher Nicholas Carr wrote a controversial article entitled “IT Doesn’t Matter.” His fundamental argument was that as information technology becomes the norm across all enterprises, its importance would diminish and companies would see little value in the huge infrastructure investments that gave early adopters a fleeting competitive edge. Carr was correct that businesses would question the value of that infrastructure, but he overlooked the real issue: enterprises aren’t in the business of managing infrastructures; they do so only when they must. That’s why so many enterprises rent their facilities, hire contract manufacturers, employ temporary staff and contractors, and use a variety of service providers for noncore functions.

Until recently, enterprises had little choice but to manage their technology infrastructure themselves. It’s easy to forget that what we now call IT has a history of about 50 years, starting as data processing in a very few, large organizations. Modern IT is a phenomenon that began in earnest only in the 1980s. With something so new, enterprises had no choice but to own and manage the infrastructure themselves, hiring a staff to tend to it. It’s no different from what happened around the turn of the 20th century, when electricity was new and businesses had their own generators and a staff to manage them.

Enterprises couldn’t give up managing their own generators until someone else could do it for them. That is, until there were municipal (and then national and even international) electricity providers that had reliable grids and universal standards for voltages, plugs, and other elements of the system. Government oversight helped speed the process along.

IT in the sense of managing technology infrastructure is on the cusp of becoming a critical but nonstrategic asset like electricity. We call this the removing-the-T-from-IT trend. Several trends are converging to make it happen, though in this case almost all of them are from the private sector:

- Commoditization: Much of what IT used to manage has been commoditized, requiring little effort to install and maintain compared with its early days. For example, network technology settled down a decade ago, storage technology has become commoditized, and most PCs are interchangeable boxes running the same operating system and core software across all users. Web browsers have forced the use of a few main standards across the growing pool of Internet-delivered applications, not to mention the mountains of information available through the Internet. (Even nonstandard PCs such as the Apple Macintosh become standard on the Web, especially in the emerging Web 2.0 form.) The commoditization also makes it easier for nonexpert users—especially the young who have grown up with computers—to manage their own technology; already we are beginning to see major companies experiment with the idea of letting users select and manage their own PCs.[1]

- Consolidation: As technology providers gobbled each other up, the number of vendor options for most core application areas decreased to a handful for each. Enterprise resource planning, database management, and business intelligence are just some of the application areas where a handful of vendors address nearly 90 percent of the market.

1. Tom Sullivan, "IT heresy revisited: Let users manage their own PCs," *InfoWorld*, 02 April 2008, http://www.infoworld.com/article/08/04/02/14FE-user-managed-pc_1.html.

The enterprise preference for application suites—over point solutions that then had to be integrated separately at each enterprise—pushed consolidation further. The result is a move toward de facto standardization of the technologies and the processes enabled through them, thereby making it easier for outside providers to manage technologies across multiple clients more cost-effectively.

- Outsourcing: The first two trends enabled IT outsourcers to manage many services for enterprises—both on premises and in shared data centers. Despite these developments, many outsourcing arrangements have ended in tears. CIOs in many cases have had a harder time managing their single, all-encompassing outsourcing partner than they did managing IT without outsourcing partners. Here too, best practices are taking shape that reduce the burden on those CIOs who rely on outsourcing. Smart outsourcing divides the responsibility for IT infrastructure management among a number of different vendors. It also designs the service requests so that competitive rebids remain possible, keeping vendors on their toes.

- Cloud and utility computing: Cheap, Internet-based telecommunications coupled with the availability of relatively inexpensive, high-capacity data centers and the rise of fairly standardized browser technologies have created an opportunity for enterprises. They could run software and even access raw materials such as computation and storage capacity over the Internet in a form of on-demand rental. Already, some business functions—such as human resources—are primarily served by on-demand providers. 55 percent of senior

executives surveyed for the Economist Intelligence Unit (EIU) survey Digital company 2013 agreed or were neutral on the topic of increased outsourced IT by 2013. (See Figure 1 on page 17.)[2] Even without the advantage of being able to serve dispersed, mobile workforces, on-demand provisioners are beginning to gain broad traction by taking one step further the idea of having a consultant manage your infrastructure. In these cases, it's not even your infrastructure anymore. (In a sense, it's a return to the time-share computing model of the 1970s, though with much more flexibility.)

These trends reinforce each other, making much of the technology that IT manages today generic enough to be handled by someone else: a consultant, a contractor, an on-demand provisioner, or even an end user.

The foregoing trends are at different stages of maturity and adoption, so the idea of accessing most common services from an on-demand provisioner is today an idea that meets much skepticism—despite early forays by a few. And the idea that users might be able to manage their own PCs, much less orchestrate business processes through some sort of mashup management tool, seems ludicrous to many dyed-in-the-wool IT staffers today.

If your company views the CIO's role as management of the technology infrastructure, then the CIO's role should die—or at least be reduced into an operational silo such as telecom or facilities.

2. Economist Intelligence Unit, *Digital company 2013: Freedom to collaborate,* September 2008, http:// www.eiu.com/sponsor/Digital2013/. Used with permission.

Today, the CIO is becoming increasingly thought of as a chief innovator, chief strategist, chief process officer, or all three.

Force II: More strategic value from CIOs

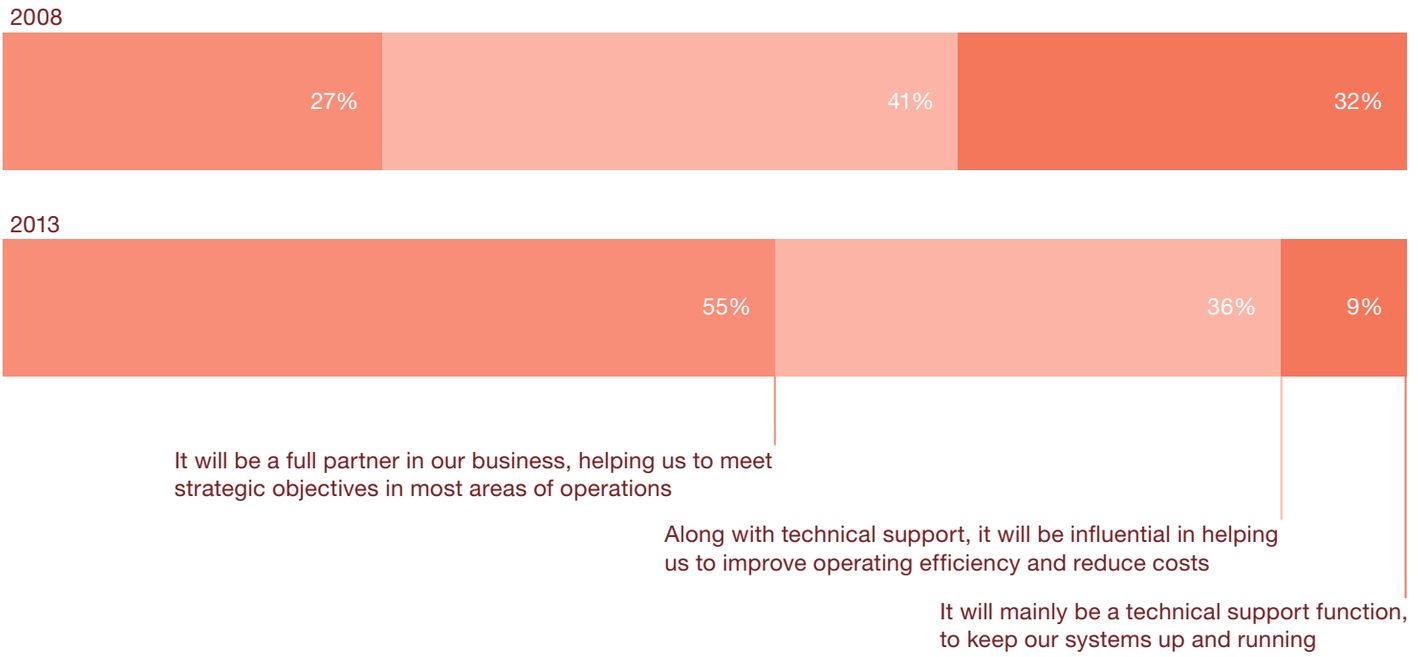
The CIO's common view of self, at least among CIOs and the technology press that serves them, is that the CIO is the core of the enterprise, providing the essential capability to execute on its strategy, thanks to the application of technology systems as mundane as e-mail and PC support and as complex as customer intelligence and supply chain optimization.

After all, IT is at the center and is where the business activities meet the tools that let them occur. In the course of technology-enabling hundreds of business activities, the IT organization has learned how the company actually works, what the business processes are, how they interrelate, and how they could be used to gain more revenue or lower costs or expand market reach.

It's natural that CIOs who manage their IT this way are in the right position to do more than enable the business; they can also lead it through innovation that they uncover and then figure out how to bring innovation into the organization's processes. More than half those surveyed in *Digital company 2013* (as shown in Figure 1) expect that CIOs will be a full partner in meeting strategic objectives by 2013. Aligning IT to the business is not the goal; having IT drive the business is a way of using IT's prowess as both the guiding star and the engine that move the organization forward.

Today, the CIO is becoming increasingly thought of as a chief innovator, chief strategist, chief process officer, or all three. Certainly, both CIOs and senior executives demonstrated that view in the EIU study. By this thinking, IT's role must expand beyond provisioning the technology infrastructure because the technology alone won't make the fundamental difference to business success any longer, now that everyone has it.

Figure 1: Which best characterizes the role that IT plays in your company in 2013?



Source: EIU, 2008

The response results in Figure 1 that anticipate a full partner role for IT departments represents a more than 100 percent gain over 2008, indicating the expectation that IT will become much more important over the five-year period.

It's no coincidence that service-oriented architecture (SOA) has gained popularity in recent years. SOA redefines technology not as infrastructure but as technology components that define and execute core business processes. Sure, there's an infrastructure to do the actual execution, but the real focus is on merging the business processes and the software services that execute them. That focus promises to eliminate the messy work of aligning business and IT, because IT and the business are one. And it promises to eliminate the huge costs of application integration and also make it easier and cheaper to change business processes, because no rigid systems are in place—just an overall architecture that ensures services work together naturally even as they are removed, added, and altered.

If a company considers the CIO the leader in identifying and driving innovative processes for the company, then the CIO's role should thrive, even if technology infrastructure per se is deemed unimportant.

Striking a balance for the right result

Setting a company's direction while favoring one of the forces described (generic IT or strategic value) over the other will put that company on a path to failure. That's because each force's proponents oversimplify the reality that an organization faces when it uses technology to business advantage.

Consider the logical result of the removing-the-T-from-IT trend. No one manages technology, which means that technology is no longer a strategic tool. Either that, or technology becomes hijacked by short-sighted employees and vendors.

To whatever degree a company chooses to accentuate the removal of the T from IT in its own IT strategy, it must keep the following caveats in mind and account for them up front:

- Commoditization brings lower cost and easier maintenance, but it can require compromises to business fit.
- Consolidation concentrates risk among fewer providers, limiting both enterprises' pricing power and backup options. The result slows entire industries.

- Outsourcing risks loss of ownership, or at least control, of a critical operational asset and perhaps even the data running through it. These risks are increasingly important as more and more core functions move outside enterprise control. Today there is no one to transfer that risk to: the outsourcers rarely accept it, and in the case of overseas outsourcers, any risk they do accept can't be enforced legally.

- Utility computing and cloud computing bring risks comparable to those that outsourcing surfaced a decade ago. These methods of provisioning computing and application power are immature, so their reliability and security are as yet untested. It's not hard to imagine hackers and data thieves targeting such providers, who after all will be responsible for mountains of data from thousands of enterprises. Don't be surprised if the insurance and auditing industries sense an opportunity here.

During a transition to T-less IT, the key risk is the transition itself. As IT management relies more and more on outside providers, vendor management will become a more critical skill. Most IT staffs, however, are optimized in favor of do-it-yourself technologists. Bad contracts

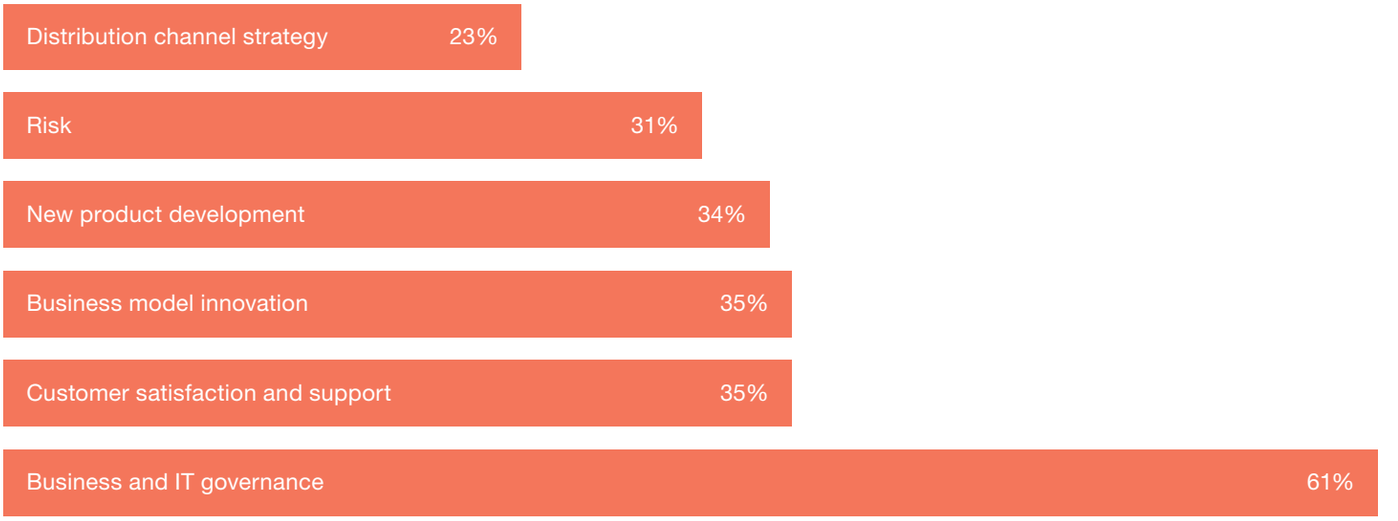
that carry dire business consequences are likely for some IT staffs, and unfavorable vendor lock-in is a likelihood for many. As end users gain more control, they will initially make mistakes—even serious ones that have real business implications. Vendors—both new and established—will fail from time to time as the cloud-computing industry feels its way in its own transition from supporting a few customers to essentially becoming a common skeletal system for all enterprises. But the biggest risk of removing the T is that the I part of the CIO's role will also dissipate or even disappear, with its value not understood. Only 30 percent of senior executives in the EIU survey believed that CIOs will lead in business model innovations. (See Figure 2.) If attitudes don't change, many enterprises could revert to the siloed approaches of yesterday. Such silos were manageable at the small scale and slower pace of most companies before the 2000s, but they form an intolerable barrier to success today.

Now consider the other force—strategic value. More and more internal processes are delivered or enhanced with the help of software. This devalues the COO relative to the CIO. Social networking automates customer interaction, devaluing the Chief Sales Officer versus the CIO. And IT drives innovation and facilitates and creates new business models, devaluing the head of R&D relative to the CIO. The innovation-era CIO is everywhere, setting the agenda and driving strategy while running operations.

If an organization somehow allows such transformation to occur, the concentration of strategic and operational power in one role is a recipe for disaster, either leading to gridlock because the CIO's office simply cannot manage and strategize everything or resulting in a rigid, controlled, "efficient" operation that cannot bend with changing business circumstances.

In any large organization, strong value is attached to a federation of talented leaders who stay on mission together through mutual efforts, guided by the CEO and board, and with an appropriate captain on each ship in the flotilla. It is the ability to specialize while serving a common goal that provides lasting capacity for success.

Figure 2: Areas of CIO leadership by 2013



Based on a survey respondent ranking. Source: EIU, 2008

The dichotomy that the two opposing forces raise is a false one. CIOs who succeed in the next decades must harness both forces at the appropriate levels.

Making the transition

How to redefine the CIO role properly

The dichotomy that the two opposing forces raise is a false one. CIOs who succeed in the next decades must harness both forces at the appropriate levels.

PricewaterhouseCoopers views the issue as similar to the famous OSI network stack, as Figure 3 shows. The bottom functions are the traditional IT infrastructure functions (the CIO-is-dead functions). Up the stack are the more strategic areas—the ones involving applications, process, and leveraged orchestration (the long-live-the-CIO functions). CIOs who intend to be long-lived must compress the lower elements of the stack or move them outside the organization by using those taking-the-T-out-of-IT developments to let generic technologies be handled elsewhere and by removing mature standard technologies from their field of focus.

Figure 3: CIO function stack

Unfortunately, many CIOs feel that their role is to juggle an ever-increasing number of balls, as the figure shows. This is an unsustainable model and is why many organizations have concluded that IT has gotten out of hand and needs to be reduced, controlled, or redirected. It's not uncommon to hear talk of taking the 75:25 ratio of IT operations to innovation costs and reversing them; that's code for "Leave innovation expenses as they are and reduce IT operations to get the 25:75 ratio we want." Not a successful context for a CIO. And that's why interest is high in technologies such as cloud computing and cost reduction strategies such as offshoring.

Although the T was important in the early years of IT—when IT was all new and needed to be figured out at a low level—much of the technology is now stable and well understood, which is precisely why it can be genericized and handled by outside providers. But the I cannot be, because it is about the intrinsic differentiating value in an organization. In a modern organization, the I stands not just for information but also for intelligence, innovation, integration, insight, instigation, and influence. It also stands for infrastructure, but as something the company specifies and uses as a value-enabling platform, not something it has to own and tinker with directly.

For companies that support expanding the I in IT, the CIO's role will be increasingly essential. And ironically, the shrinking demands of the T part will make the CIO better able to focus on the I in all of its meanings (see Figure 4), which is what provides the strategic advantage. CIOs who try to hold on to it all will fail as the scale becomes untenable.

Figure 4: The many responsibilities of the CIO

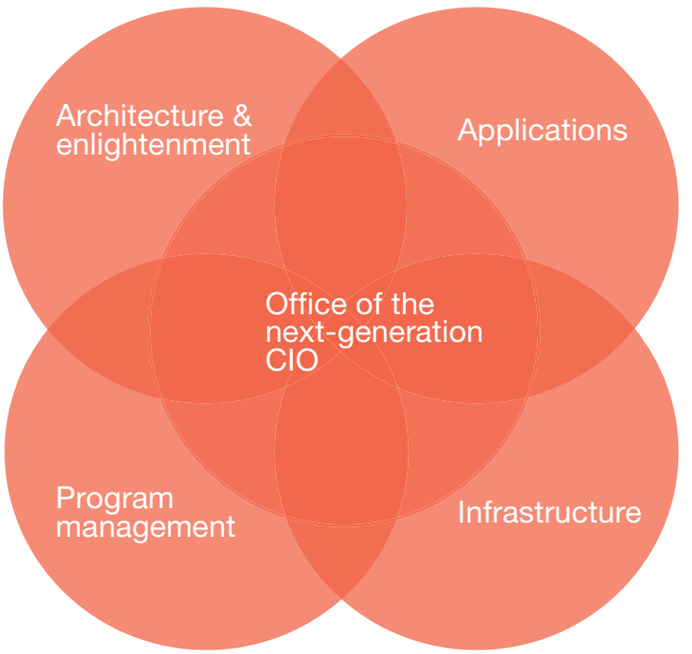
Function of the CIO is becoming more complex.

Responsibilities are not always recognized by both exectuive and CIO.

Outsourcing does not remove responsibilities.

How do we move this to a discussion about opportunities?

- Change management
- Organizational change
- Governance and risk mitigation
- Complexity remediation
- Services and application design



Instead, the CIO's focus should move up the stack to the value-creating, differentiating technologies, to the understanding and enablement of value-adding processes, and to the orchestration of technology-enabled processes to provide more value than if they were left in their silos. In that context, an SOA approach is a given—as long as the architecture and business processes don't become solely the province of IT; to work, they must be jointly owned.

Note that the mix and balance within the stack will differ from organization to organization, as well as across industries. That's fine, as long as the CIO figures out the right balance for his or her context. Also note that this stack assessment and realignment is not a onetime activity; over time, items move down the stack, and when they reach that CIO-is-dead zone, they must be either compressed through genericization or outsourced through automation and/or external providers.

In most organizations of any scale, the CIO and members of the higher-level IT team are the only ones in the enterprise who actually understand (1) the business processes across the enterprise, (2) how those processes are connected to each other, (3) how the processes are actually executed, and (4) where technology could improve their efficiency, reach, or results. The CFO has a wide view, but only of the financial flow, not of the business processes themselves. And the COO should have a view of the business processes but, typically, is limited to operations—without a full understanding of either the underlying processes or the strategies underpinning them.

Someone will need to fill that gap: the C-suite as a whole, or a redefined COO, or a redefined CIO. It may as well be the CIO (in partnership with the C-suite, of course).

Acknowledgments

Advisory

Sponsoring Principal
Paul Horowitz

US Thought Leadership

Partner-in-Charge
Tom Craren

Center for Technology and Innovation

Managing Editor
Bo Parker

Project Lead
Terry Retter

Principal Author
Galen Gruman

Project Editor
Alan Morrison

Editorial Advisers
Vinod Baya, Larry Best, Glen Hobbs, Jim Kinsman, Bud Mathaisel, Justin McPherson, Jonathan Reichental, Terry Retter, Joe Tagliaferro

Copyeditors

Lea Anne Bantsari and Paula Plantier for EditAmerica

Graphic Design

Creative Director
Howard Allen

Designers and Illustrators
Bruce Leininger and Diana Lira

Photographers
Matt Schodorf and Marina Waltz

Online

Director, Online Marketing
Jack Teuber

Designer and Producer
Joe Breen

Reviewers

Paula Adler, Richard Beaumont, Sean Middleton

Marketing

Angie Chambliss

pwc.com/us

To have a deeper conversation about how this subject may affect your business please contact:

Paul Horowitz
Principal, Technology Leader
PricewaterhouseCoopers
(646) 471-2401

paul.j.horowitz@us.pwc.com

This publication is printed on Exact Opaque, which is Green Seal™ certified and contains 30% recycled post-consumer fiber and meets the Executive Order governing recycled content in printing/writing grades.

30% total recycled paper