Why isn’t IT spending creating more value?*

How to start a new cycle of value creation

*connectedthinking

PRICEWATERHOUSECOOPERS

Table of contents

June 2008

Why isn’t IT spending creating more value?

The corporate will to invest in information technology (IT) has never been greater. However, while companies continue to spend more on IT, IT's contribution to productivity growth has been declining steadily. What's causing this phenomenon, and how can business leaders reverse course and start a new cycle of IT value creation?

It's generally acknowledged that between 1995 and 2000, IT-related improvements enabled American workers to produce far more goods and services than had been projected. Real gross domestic product increased by at least 4 percent each year, while labor output per hour grew 2.75 percent annually—almost doubling the pace of the preceding quarter century. IT accelerated the flow of information, management of customers and inventory, and computerization of back-office systems, and drove the newly ubiquitous field of Internet commerce.

Economists now believe that IT-related productivity for the US corporate sector hit a wall sometime in the early 2000s and has been trending downward ever since. This dynamic is not for lack of investment; in fact, IT spending consumes more of each revenue dollar every year.

The economics surrounding IT and how it consumes corporate resources—a dynamic that PricewaterhouseCoopers has dubbed "techonomics"—helps explain this drop in IT-related productivity. As consumption of IT increases and as technologies change and advance, businesses have been left to cobble together disparate software and hardware systems and tools. The end result? Unchecked IT spending, unneeded complexity, redundant systems, underutilized hardware and data centers, the need for expensive IT security, and, inevitably, diminishing returns from IT. In short, low levels of IT productivity create conditions for an IT cost crisis.

Most industries, in fact, spend less than 15 percent of their IT budgets on innovation,[1] meaning that the lion's share goes to maintenance and upkeep of IT operations. PricewaterhouseCoopers believes that the only way to restore IT's unique ability to help workers be more productive—and the only way for IT to re-emerge as a competitive advantage—is for corporate leaders to strategically rethink how IT spending contributes to value creation.

CIOs, in particular, must show the way through the thicket of IT overcomplexity and re-imagine IT as a source of innovation. But each member of the C-suite must play a role in creating IT value: the CEO in aligning IT initiatives with overall strategy, the CFO in prioritizing and understanding IT value management, and the COO in ensuring that IT initiatives support crucial, customer-facing business processes.

By managing in IT innovation and managing out IT complexity, companies can once again truly drive value through their IT spending.

[1] Gartner IT Key Metrics Data 2008.

An in-depth discussion

IT’s contribution to productivity growth has declined.

The continuous growth of IT spending over the past 30 years reflects a central tenet of modern business: Technology enhances productivity. But the evidence suggests that IT's contribution to growth in US productivity has been declining since 2001.

From 1995 to 2000, information technology played a central role in the productivity of IT-intensive industries such as financial services, media, and telecommunications, all of which experienced faster productivity growth than other industries.[2] Economic studies built empirical evidence that IT users experience productivity gains[3] and economists generally agreed that the decline in quality-adjusted prices and the increase in computer processing power contributed "directly to aggregate, or economy-wide, productivity gains."[4]

Sixty-five percent of 1,150 CEOs interviewed for PwC's *11th Annual Global CEO Survey* cited technological innovation as a key source of competitive advantage.

[2] Stephen D. Oliner, Daniel E. Sichel, and Kevin J. Stiroh, "Explaining a Productive Decade," Brookings Institution (June 25, 2007).

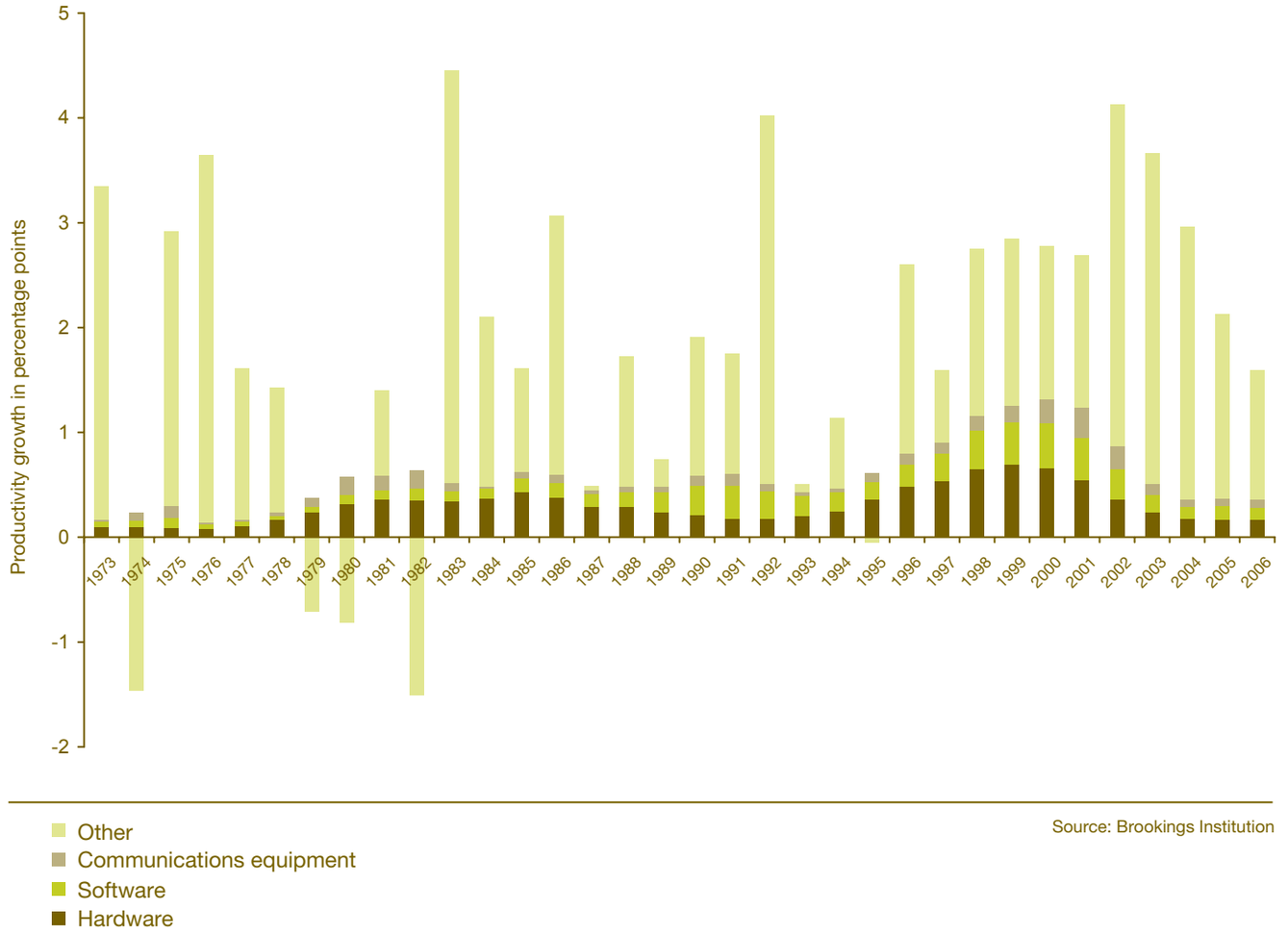
[3] In addition to "Explaining a Productive Decade" cited above, Kevin J. Stiroh has demonstrated that the link between productivity gains and IT investment in the 1990s applies to IT users as well as producers. See Kevin J. Stiroh, "Investing in Information Technology: Productivity Payoffs for U.S. Industries," Federal Reserve Bank of New York, *Current Issues in Economics and Finance* 7, no. 6 (June 2001). Also, in 2003, Erik Brynjolfsson and Lorin Hitt produced a seminal study that suggested companies with higher IT investment relative to industry averages are more productive. See *Optimize* (March 2006).

[4] Kevin J. Stiroh, "Investing in Information Technology: Productivity Payoffs for U.S. Industries," Federal Reserve Bank of New York, *Current Issues in Economics and Finance* 7, no. 6 (June 2001).

But as Figure 1 shows, business communications equipment, hardware, and software began contributing less to rising US productivity after 2000. While these IT inputs were responsible for almost half of the productivity growth in the US economy in 2000 (1.32 percentage points of the total 2.78 percentage point rise), by 2006 they were directly linked to less than one quarter of productivity growth (only 0.36 points of the total 1.59 point rise).

How ironic that even as US businesses are convinced more than ever of IT's value, its productivity benefits have been waning for more than five years.

Figure 1. Contributions to growth in US productivity



Source: Brookings Institution

What happened to IT's productivity benefits after 2000?

PricewaterhouseCoopers believes that the decline in IT-related productivity over the past few years is attributable partly to an unintended consequence of Moore's Law. In a 1965 paper, future Intel co-founder Gordon Moore noted that the number of transistors that could be placed inexpensively on an integrated circuit had approximately doubled every year, and would continue to do so. Though Moore later revised his prediction to a doubling every two years, it's the exponential nature of the growth that's most salient, especially as it's become apparent that Moore's Law also applies to many other aspects of IT, including processing speed, memory capacity, computing power per unit cost, and hard disk storage.

As the cost of computer power has continued to fall, it has been easier and easier to fulfill business units' demands for more features, functions, and applications. The result is greatly increased IT complexity, a phenomenon we refer to as Moore's Flaw. The ramifications of Moore's Flaw are all around us. Within two years, in fact, over one billion transistors will be manufactured for each man, woman, and child on earth.[5] As consumers, we enjoy the products that this admirable innovation brings, but at the expense of accompanying IT complexity.

[5] Semiconductor Industry Association figures: www.sia-online.org/ind_facts.cfm.

In the corporate environment, a watershed has been reached where many factors are simultaneously working against the creation and realization of value from IT spending. Falling unit prices, increasing computing power, evolving delivery models, miniaturization, and mobilization have all combined to saturate American companies with IT. Take delivery models, for example. Today's managers are taking the initiative by simply going online and buying on-demand functionality to support their groups' business activities, bypassing the purchasing and IT departments. While well-intentioned, this spending can compound complexity and its costs by creating redundant applications, inconsistent processes, interoperability challenges, and weak security.

The effect on system maintenance costs is particularly severe. A new application, platform, or piece of hardware not only adds individual maintenance costs, but also increases the complexity of the entire IT system, drawing resources away from innovation to the task of maintaining disparate, inefficient systems. The prevalence of interoperability problems is considered so burdensome to US competitiveness that it has even drawn federal scrutiny, with the Enterprise Integration Act of 2002 authorizing collaboration between government and industry to develop enterprise integration standards.[6]

A significant challenge for companies, then, is to manage out unneeded complexity. Once they free up corporate resources by managing out complexity, they'll be able to redirect these resources to spending on IT innovation.

[6] The Enterprise Integration Act was signed into law (Public Law 107-277) on November 5, 2002. It authorizes the National Institute of Standards and Technology (NIST) to "work with major manufacturing industries on an initiative of standards development and implementation for electronic enterprise integration." The requirements of the Enterprise Integration Act of 2002 have been addressed for the last few years by an NIST initiative called "Manufacturing Innovation Through Supply Chain Integration."

Enterprise resource planning: a scorecard

Changes in enterprise software are being driven not just by cost, but by what today's generation of enterprise resource planning (ERP) software promised but failed to deliver.

What has ERP 1.0 accomplished?

- By using one (or a few) ERP instances within large enterprises, ERP creates internal standards for many company processes and associated data definitions.
- The adoption of an ERP suite integrates disparate computer systems and in many cases allows one definition to be created for multiple common data elements.
- Because ERP vendors base their process definitions on their knowledge of best practices, enterprises can re-engineer many processes simply by adopting the software. However, processes are changed to reflect what the software can do, not what is necessarily ideal or distinctive for the business.
- As a result of the preceding, ERP investments produce an overall return, even though adoption is time-consuming, expensive, and risky.

What has ERP 1.0 failed to accomplish?

- This generation of ERP is not designed to easily incorporate customizations. It encodes process definitions in proprietary source code. Changing this code is difficult, risky, expensive, and therefore rarely done. Enterprises forego opportunities to optimize their processes, because even a “better than best” practice is usually not worth the total cost of ownership.

- Because this generation of ERP is focused on what enterprises have in common (i.e., horizontal processes), it does not automate many vertical-specific business processes where real value is created for individual enterprise customers.

- The architecture for this generation of ERP assumes that users will upgrade infrequently. It did not anticipate the need for frequent, business-driven upgrades as strategy and market conditions dictate.

- This generation of ERP does not interoperate well with third-party applications, making integration with feeder systems costly during both initial deployment and subsequent upgrades of ERP and other applications.

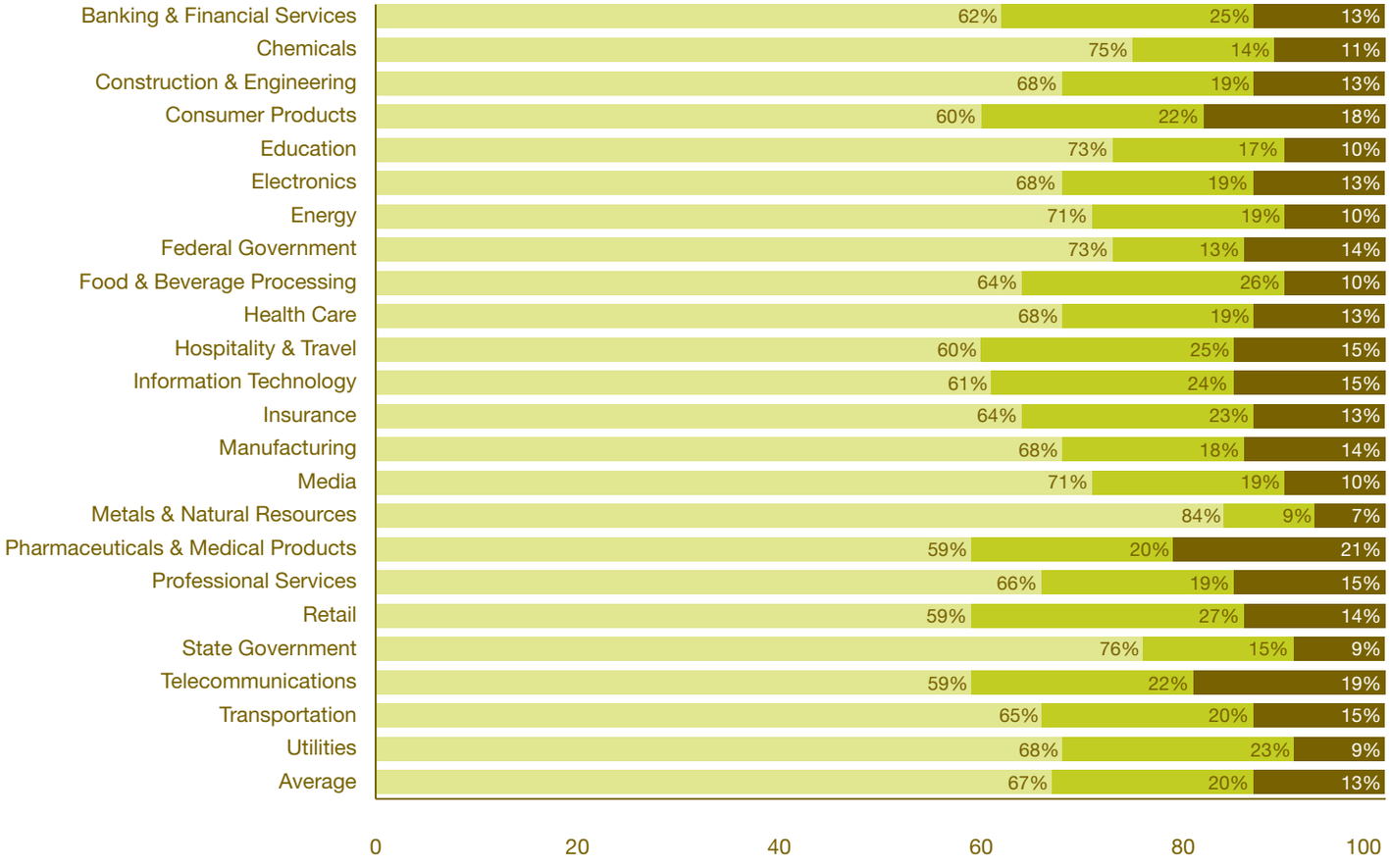
- Because of the above, this generation of ERP does not create an efficient context for companies to adapt and re-engineer processes in order to achieve competitive advantage.

IT innovation is the chief casualty of this preoccupation with system maintenance. In 2007, only 13 percent of the average IT budget supported innovation in business processes or products. This is shown in Figure 2 as IT spending to transform business. The remaining 87 percent disappeared into the black hole of general maintenance and upkeep, shown in Figure 2 as spending to run and grow business.[7] The ability of CIOs and other IT leaders to break away from these long-established spending patterns and support business process innovation instead will be the greatest source of IT value and productivity in the future. The key is that the proportion of IT budgets dedicated to innovation must increase,[8] while IT complexity must be managed out to prevent innovation from drowning in a sea of redundant systems, applications, and hardware.

[7] Gartner IT Key Metrics Data 2008.

[8] Central to creating a more flexible IT budget is identifying IT investments that are commodities. PwC's *Management of IT Value* by Mark Lutchen, James Chrispin, and Peter Broshuis (December 2005) discusses disaggregating IT budgets in detail.

Figure 2. IT spending to run, grow, and transform the business (2007)[9]



Source: Gartner IT Key Metrics Data 2008

[9] "Run" is defined as costs to keep the business running, including regulatory compliance and break-and-fix spending. "Grow" is discretionary spending to add new products, product functionality, or new features. "Innovation" is spending on new technology that will radically change business processes or products (e.g., e-commerce or RFID).


sale

“It’s important not to let complexity creep in.”

Hewlett-Packard Chairman and CEO Mark Hurd

A good example of a highly strategic redeployment of resources is included in the side feature on Hewlett-Packard (page 17). Among other things, the company closed numerous far-flung data centers and established three sets of “paired” centers, with duplicate systems that provide maximum data backup. By managing out complexity, HP was able to both reduce long-term IT maintenance costs and gain a single perspective on how it interacts with customers across the enterprise. The company reclaimed IT dollars from the dustbin of system maintenance—resources that could then be targeted to whatever innovations HP’s employees could conjure up.

The need to reduce complexity

Changing one element in a complex IT infrastructure can cause ripples throughout the system, negating the local, short-term value of the new technology by imposing long-term maintenance costs. Infrastructure consolidation is, therefore, a major step toward reducing complexity.

After assembling 3,500 to 5,000 applications, 21,700 servers, and 85 data centers in 29 countries, HP greatly reduced those numbers.[10]

Figure 3. HP IP before and after transformation

From	To
85+ data centers in 29 countries	3 paired centers
3,500 to 5,000+ applications	1,100 applications
21,700+ servers	14,000 servers
762+ data marts	Single view of the enterprise
Excessive power consumption	Power and wattage reduced by 65%

Source: Forrester Research, Inc.

According to HP Chairman, CEO, and President Mark Hurd, the crushing effects of complexity are not confined just to IT: "You have to have an operating model that allows two things: that allows customers to easily do business with the company and allows employees to execute. Even if you have a great strategy, many companies are challenged if the execution is too hard or too complicated. That's particularly true with a company the size of HP. Analysts project that we'll do $103 billion in sales across 179 countries this year. There are opportunities for us to get a slight bit complicated. But it's important not to let that complexity creep in."[11]

[10] Laurie M. Orlov, Merv Adrian, and Bo Belanger, "HP: One CEO's View of IT," Forrester Research (April 23, 2007), p.3.

[11] William J. Holstein, "Seeing Recruiting as Crucial to Rebuilding H.P.," *The New York Times* (October 13, 2007), www.nytimes.com/2007/10/13/technology/13interview-web.html?ref=business.

How to rein in and redirect the spending explosion

Current-dollar IT spending in the US has risen to 140 times the 1960 level, while current-dollar GDP has increased to 26.3 times the 1960 level.[12] As a proportion of current-dollar US GDP, current-dollar IT spending reached 6 percent in 2005.[13]

The explosion in IT spending is being fueled by slowing price declines, rigid maintenance costs, a trend towards non-durability, increasing IT complexity, and growing shadow spending (i.e., IT spending that is not accounted for in the literal IT budget).

To pinpoint exactly how companies should redirect their IT spending, it's helpful to look back at the increase in US IT spending over the past few decades. Using GDP as a proxy for corporate revenue,[14] PricewaterhouseCoopers' analysis shows that US IT spending[15] as a percentage of US GDP has increased steadily since 1960, despite a 30-year decline in quality-adjusted IT prices.

[12] In 1960, current-dollar US GDP equaled $526.4 billion and current-dollar US IT spending equaled $2.6 billion. PricewaterhouseCoopers has calculated current-dollar IT spending and current-dollar GDP in 2004 relative to those 1960 levels—i.e., the level of GDP and IT spending in 1960 equals 1 in our calculations.

[13] PricewaterhouseCoopers' analysis of data provided by the Bureau of Economic Analysis.

[14] PricewaterhouseCoopers believes that GDP is an accurate proxy for corporate revenue at the macroeconomic level. IT spending represents the final cost of computers, software, and communications and does not include intermediate buyers/sellers that sell chips and parts of computers to final sellers who then sell the whole computer to the final end user. Likewise, GDP is the value of all final goods and services.

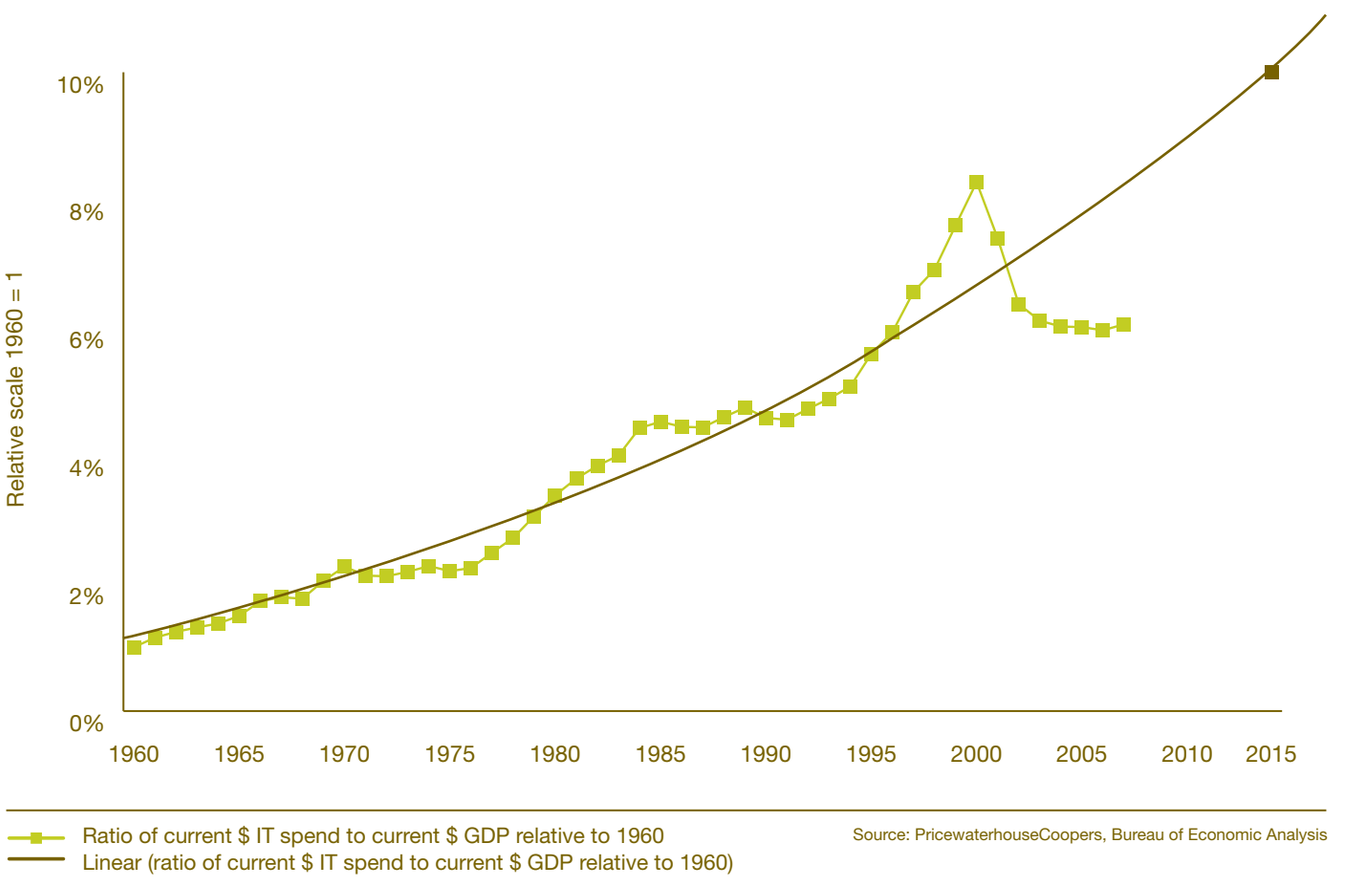
[15] In its calculations of IT spending versus GDP, PricewaterhouseCoopers has used data from the Bureau of Economic Analysis, whose definition of IT spending does not include services or outsourcing.

PricewaterhouseCoopers predicts that, barring a full-blown US recession, current-dollar IT spending will grow at a compound annual rate of 17 percent from 2010 to 2015, reaching 10 percent of current-dollar GDP by 2015. Our estimate is based on our understanding of techonomics and on the projected impact of unchecked IT complexity. If current resource allocation patterns persist, a very real possibility exists that the ranks of US business will soon be clogged with companies saddled with unwieldy, overly complex technology environments and costs that are very difficult to manage.

To avoid that scenario, today's executives need a much better understanding of which IT investments maintain and create competitive distinction, and which can—and should—be cut or managed differently. A good place to start is by understanding the potential correlation between IT spending and profitability.

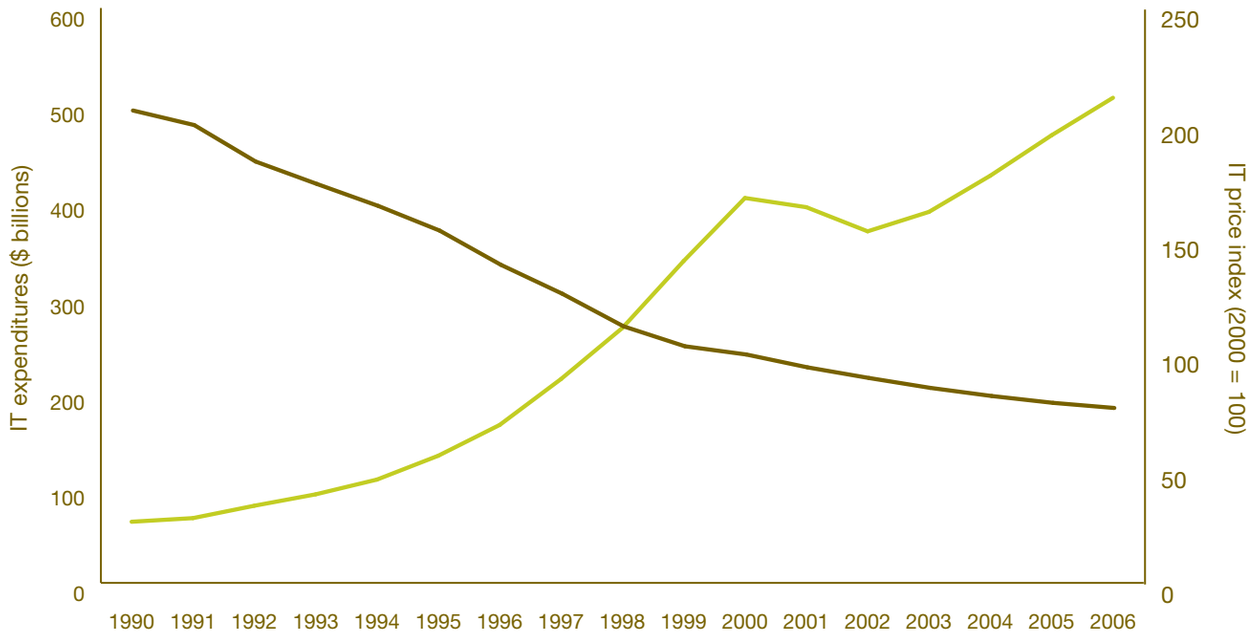
CEOs struggle to understand why total IT costs keep increasing despite falling IT unit costs, and why IT continually consumes more of the corporate budget.

Figure 4. Ratio of current-dollar IT spend to current-dollar GDP relative to 1960



Source: PricewaterhouseCoopers, Bureau of Economic Analysis

Figure 5. IT price declines and IT consumption[16]



Source: PricewaterhouseCoopers, Bureau of Economic Analysis

[16] The IT spending data from the Bureau of Economic Analysis on which PricewaterhouseCoopers has based its analysis of macroeconomic IT spending, IT price declines, and IT consumption is taken from the "Investment" portion of the national accounts (i.e., in C+I+G+netX) and therefore represents all business IT spending. Consumer spending on IT is located in another sub-account, which PricewaterhouseCoopers did not employ.

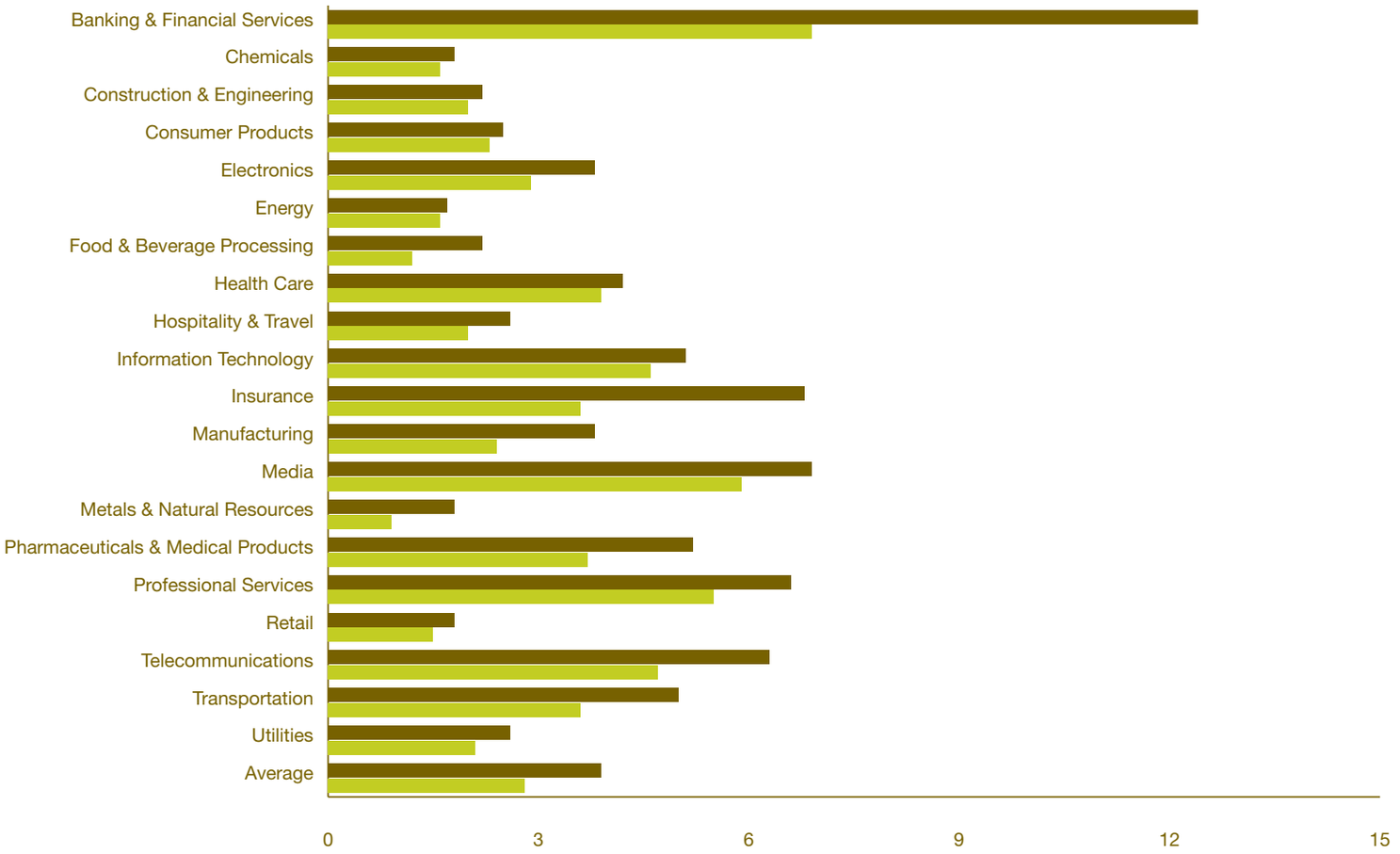
The more companies spend on IT, the less value is created.

IT dependency is rising across all sectors

Banking and financial services, media, and information technology are currently the most IT-intensive industries. The average for IT spending at US companies in 20 different industries is now 3.1 percent of revenue and 4.3 percent of operating expenses.[17]

[17] PricewaterhouseCoopers has used GDP as a proxy for corporate revenue at the macroeconomic level. This approach agrees with the IT spending data from the US government's Bureau of Economic Analysis. The available data on sector revenue uses a wider definition of revenue than GDP. GDP includes only final goods produced in the US, whether by US or foreign companies. The sector data includes only the revenue of US companies, but from primary, intermediate, and final goods produced anywhere in the world. This means PricewaterhouseCoopers' macroeconomic proxy for corporate revenue—i.e., GDP—would be smaller than the sum of all the industry revenue totals, from which the 20 industries in the "IT dependency" graph are drawn. In both calculations, IT spending represents the final cost of computers, software, and communications. Interpreting different economic definitions and benchmarks is one of the challenges of techonomics, but despite the differences in the components of these two analyses, the overall conclusion is clear: The level of IT spending is high and increasing across all industries.

Figure 6. IT dependency of US companies (2007)



Source: Gartner IT Key Metrics Data 2008

How to determine the correlation between IT spending and profitability

Assessing corporate IT performance and its contribution to value within an individual organization remains the holy grail of IT value management.

IT spending, of course, does not affect all sectors or all firms equally. Different industries use technology to drive different aspects of their businesses, and an individual firm's business model also has an important impact on IT consumption. The necessarily complex calculus underlying the determination of IT value has sometimes been interpreted as evidence of a weak link between IT spending and performance.

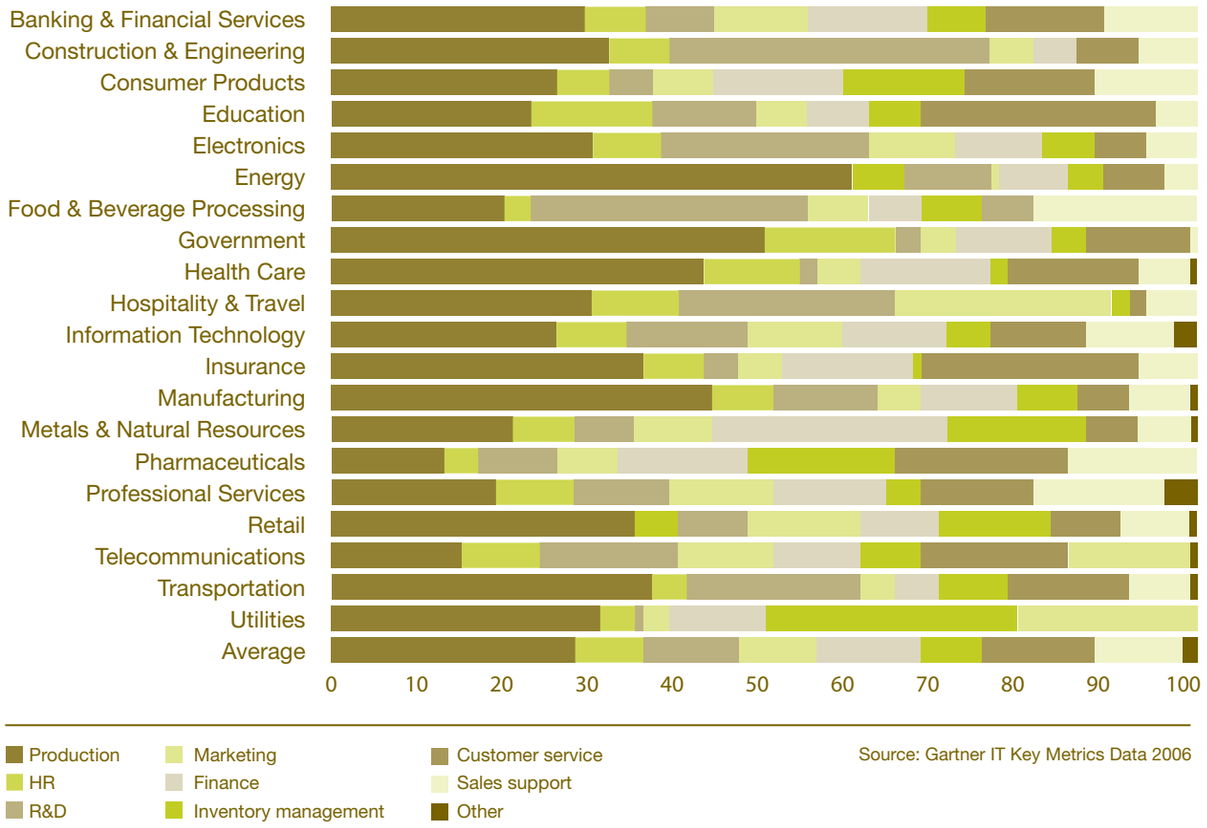
In 2003, for example, Nicholas Carr, a leading commentator on technology and business, argued that "IT doesn't matter" because the strategic and competitive advantages of IT spending quickly dissipate.[18] PricewaterhouseCoopers believes that the evidence supports a different view: In order to create and sustain value, IT investment must support organizational and business process change and innovation.[19] But how can one determine whether IT is providing this support?

Comparing IT spending, profitability, and operating expenditures at the sector level offers some clues as to how a company can measure IT value relative to investment. In PricewaterhouseCoopers' analysis of data provided by Gartner, Inc., we found that in industry sectors where operating expenses were less than 75 percent of revenue in 2003, 2004, and 2005, the highest IT spenders also generated the highest net profit margins. Banking and financial services led the field with an IT spending rate of 5.4 percent of revenue and a net profit of 24 percent, followed by four other IT-intensive industries: professional services, telecommunications, media, and information technology. Sectors in which operating expenses were more than 75 percent of revenue generally achieved lower profit margins with lower IT spending levels.

[18] Nicholas Carr, "IT Doesn't Matter," *Harvard Business Review* (May 2003).

[19] A month after Carr's article appeared, the *Harvard Business Review* published responses in a piece called "Does IT Matter? An HBR Debate" (June 2003). The counter-arguments to Carr's hypothesis included the idea that extracting value from IT requires innovation in business practices. This idea was further developed by Howard Smith and Peter Fingar in *IT Doesn't Matter—Business Processes Do: A Critical Analysis of Nicholas Carr's I.T. Article in the Harvard Business Review*, Meghan-Kiffer Press (August 2003).

Figure 7. IT spending by industry and function



Source: Gartner IT Key Metrics Data 2006

Figure 8. IT spending, net profit, and operating expenses (US industries, 2005)

Operating expenses less than 75% of revenue	Net profit	IT spend % revenue	OpEx % revenue	Operating expenses more than 75% of revenue	Net profit	IT spend % revenue	OpEx % revenue
Banking & Financial Services	24.0%	5.4%	49.3%	Energy	10.7%	2.3%	77.5%
Professional Services	19.3%	4.5%	72.2%	Pharma & Medical Products	9.8%	4.0%	84.0%
Telecommunications	13.5%	3.9%	59.1%	Chemicals	9.0%	2.4%	94.0%
Media	11.9%	4.9%	64.7%	Transportation	9.0%	3.3%	76.6%
Information Technology	10.7%	4.7%	59.2%	Consumer Products	7.4%	2.6%	82.1%
Construction & Engineering	7.1%	1.7%	72.3%	Insurance	6.8%	3.3%	81.7%
Metals & Natural Resources	6.1%	1.4%	45.3%	Retail	6.5%	2.1%	78.6%
Electronics	5.4%	3.4%	56.1%	Food & Beverage Processing	5.9%	2.2%	83.5%
Utilities	5.1%	2.5%	40.6%	Manufacturing	5.5%	3.6%	77.7%
Health Care	4.3%	2.9%	74.9%	Hospitality & Travel	3.6%	4.8%	89.2%
Average	10.7%	3.5%	59.4%	Average	7.4%	3.1%	82.5%

Source: Gartner IT Key Metrics Data 2006

By measuring total IT costs in the context of operating expenditures and revenues, a company could potentially infer whether its IT budget is too high, too low, or misaligned with business objectives. For instance, those companies with low IT spending and lower profit margins relative to their industry averages may not invest sufficiently in technology. A bank that invested just 3 percent of revenues in technology, for example, would be far below the sector average, and if its profitability suffered during this period, the case could be made that the company should invest far more heavily in technology.

Conversely, companies with higher IT spending and lower profit margins may be overspending. A construction company that invested, say, 3.5 percent of revenues in technology (against a sector average of 1.7 percent) and experienced profitability of just 6 percent (the sector average being 7.1 percent) might have overspent on IT during this period. Lastly, when an organization spends the same on IT relative to peers but realizes lower profit margins, the problem may lie in the management of IT spending—specifically, in the misallocation of its IT investment.

A sector-based comparison provides only one data point that requires further analysis. Spending benchmarks must take into account business cycles and other macro- and microeconomic factors that affect revenue and profitability. For instance, the banking and financial services sector remained the largest industry investor in IT through 2007, with an IT-to-revenue ratio of 6.9 percent and net profit of 35.1 percent.[20] But financial services firms are having a difficult 2008, and if these companies' IT spending remains the same or increases, it will be extremely difficult to draw any correlation between IT spending and profitability.

Simply put, PricewaterhouseCoopers' analysis of IT spending, operating expenditures, and revenue over multiple years suggests that IT planning should take into account exactly how these metrics change through the rise and descent of a company's own business cycle. Using business valuation methods that account for these cycles of investment and return, companies can better understand how their IT spending stacks up against industry competitors, as well as determine—in their own individual cases—whether higher margins lead to more IT spending or whether the right kind of IT spending leads to higher margins.[21] Once firms have a good understanding of how their IT investments correlate with profitability, the next step is unleashing the value that's locked up in unproductive spending.

[20] Gartner IT Key Metrics Data 2008.

[21] PwC's *Management of IT Value* by Mark Lutchen, James Chrispin, and Peter Broshuis (December 2005) examines the current state and possible future of business valuation methods, including ROI analysis, the balanced scorecard, and the IT management accounting guideline published jointly by CMA Canada and AICPA in December 2004.

How to start a new cycle of value creation.

There's a silver lining in all of this data for CIOs and other managers charged with reclaiming the productivity gains that IT once provided. Already, the market is responding with tools and applications targeting the inefficiencies of the current IT model in multiple areas: process innovation, cost variability, interoperability, and complexity.

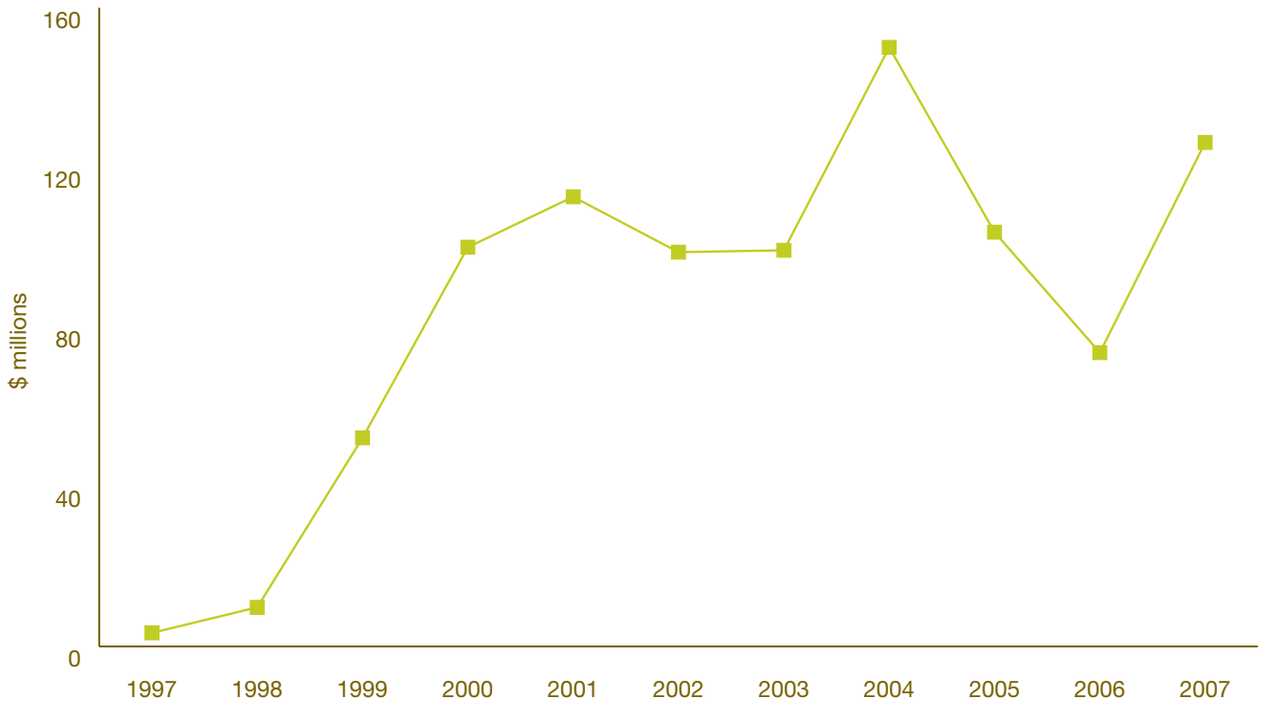
The CIO will need to engage the entire C-suite in creating a new cycle of value creation. CEOs, for example, need to understand the IT implications of their grand strategies. CFOs and CIOs should collaborate to explain the business case for eliminating systems and hardware that some business units may have come to depend on. COOs must demand IT architecture that drives value to customers.

Technology itself is addressing some of the drivers and inhibitors of IT value by addressing innovation and the complexity and inflexibility of IT budgets. For example, software as a service (SaaS) promises to allow users to "pay by the drink" and significantly reduce the capital wasted in supporting unused software and hardware.

More fundamentally, a new ecosystem of architectures and standards is also emerging.[22] Venture capital investment in service-oriented architecture (SOA), an IT infrastructure that enables better business processes by allowing different applications to more easily exchange data, has totaled approximately $1 billion over the past ten years and may have surpassed $120 million in 2007. US patent applications related to SOA will reach an all-time high this year. Many IT system architects believe that SOA will enable businesses to better align their IT systems with the actual services they provide consumers, equipping them to respond more effectively to changing consumer demands. But this issue cannot be laid solely at the feet of the CIO.

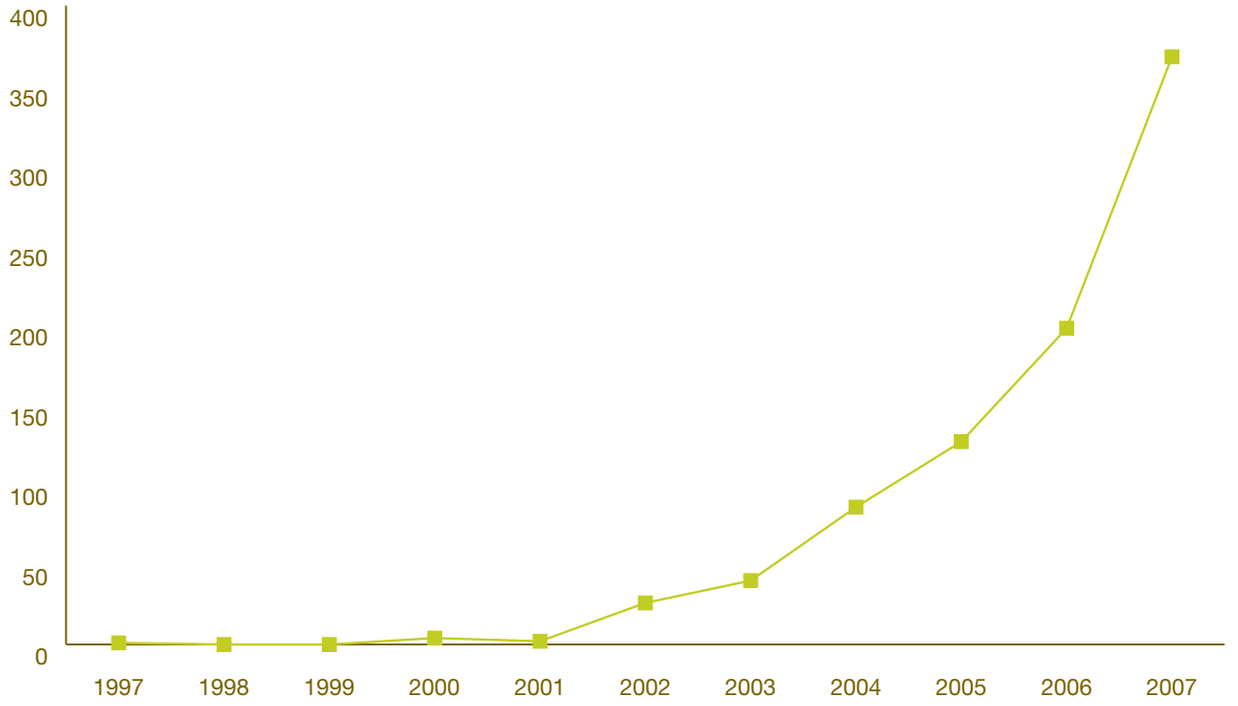
[22] In addition to SOA and SaaS, others include grid computing, Java/J@EE, Web services, Business Process Execution Language (BPEL), and HTTP.

Figure 9. Venture capital investment in SOA



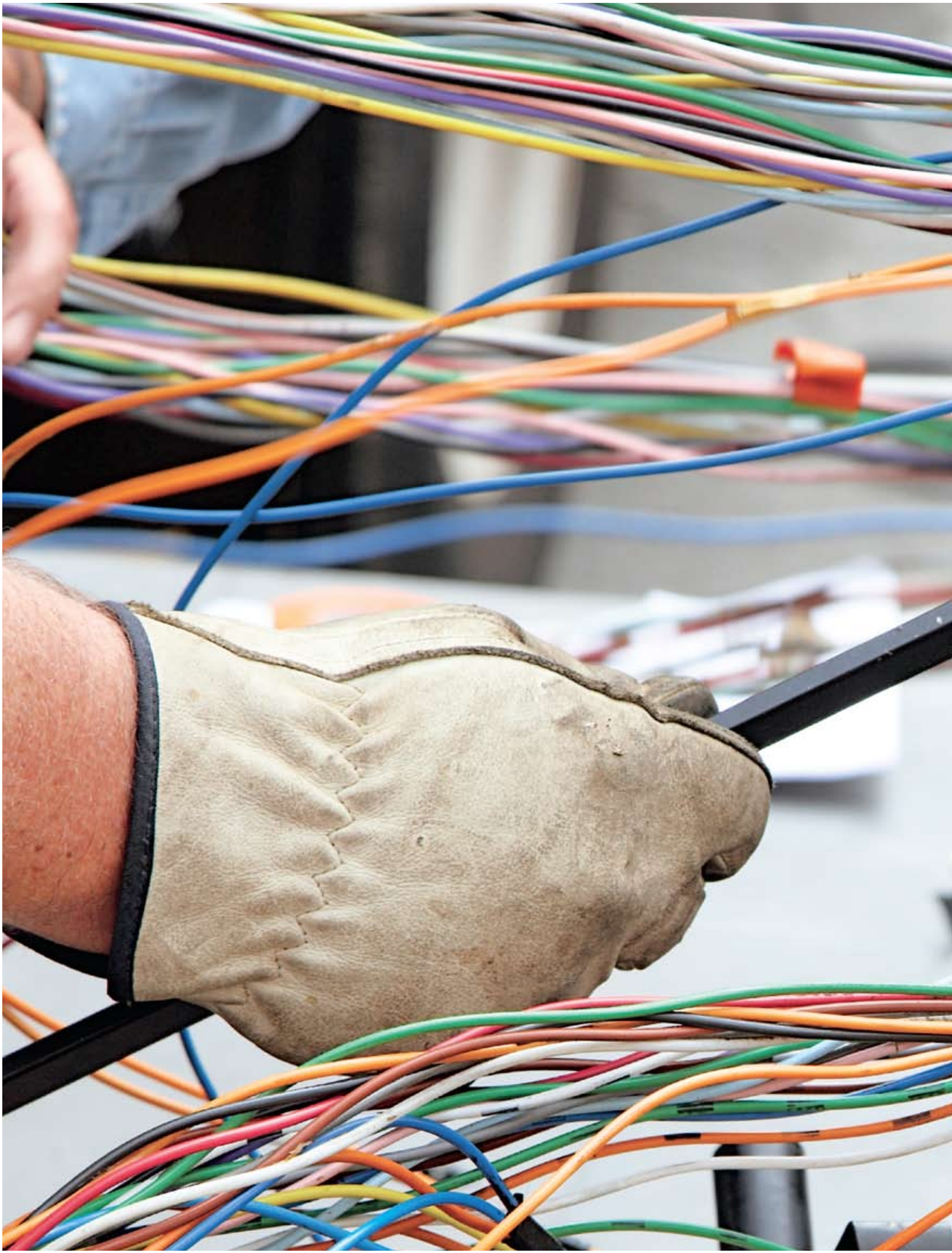
Source: PricewaterhouseCoopers MoneyTree

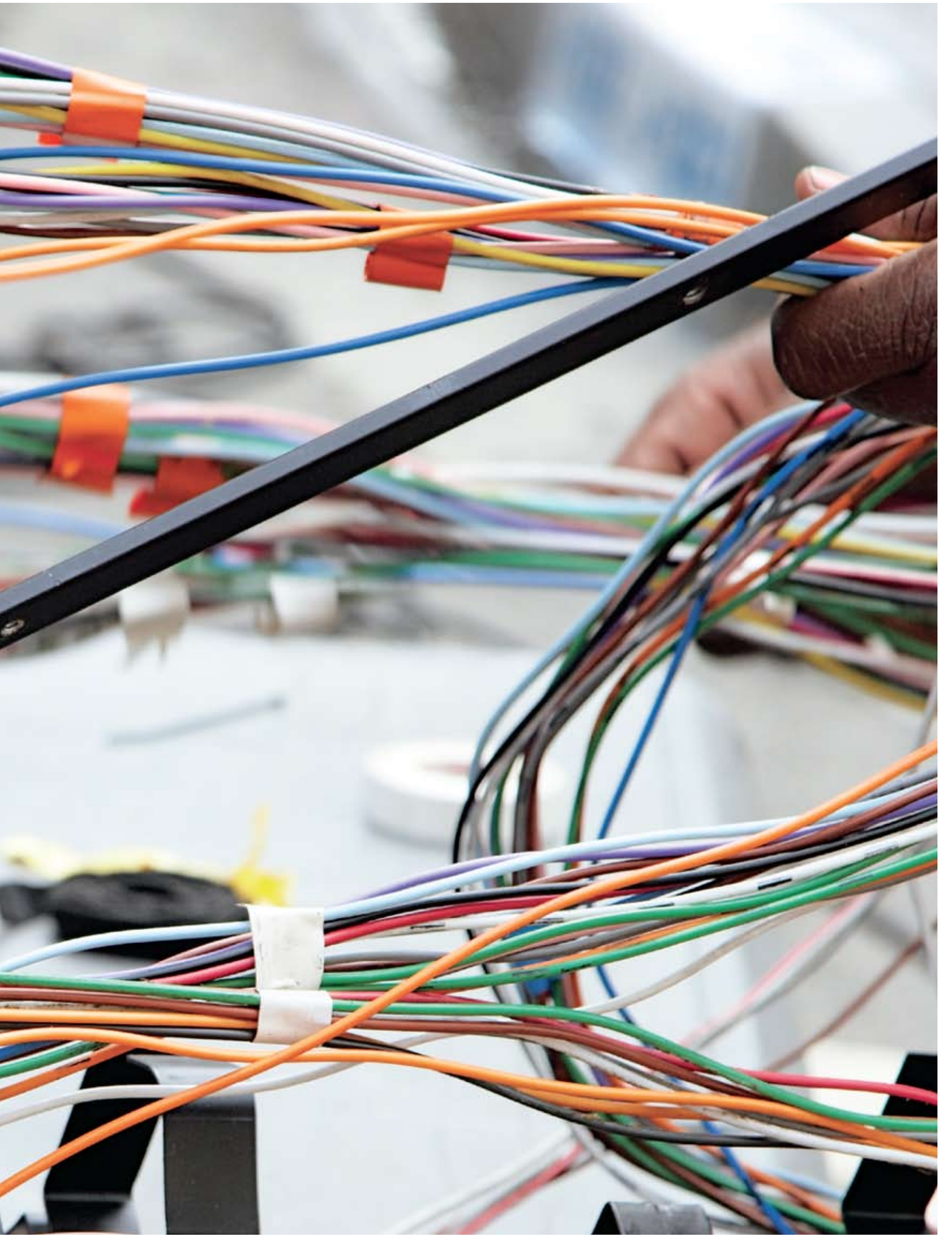
Figure 10. Patents for SOA



Source: PricewaterhouseCooopers,Thomson US Patents full text

To get the most out of IT investment, the entire C-suite must take on the issue.





Over the next five years, enterprise software will continue its evolution to offering a management platform that allows customers to design, deploy, manage, and measure their own unique business processes. This structural transition is fundamentally altering the nature and purpose of enterprise applications and, PricewaterhouseCoopers believes, will be more disruptive than the move to client/server architecture in the 1990s.

The core of the next generation of enterprise software is the concept of "loose coupling," or decoupling the business process logic from static source code so that the software can be modified and managed to accommodate changing business requirements.[23] As Figure 11 shows, the difference between the prior generation ("enterprise 1.0") and next generation ("enterprise 2.0") is significant.

Figure 11. Enterprise 1.0 vs. enterprise 2.0

Enterprise 1.0 focus	Enterprise 2.0 focus	Impact
Process standardization	Process differentiation	Firms will be able to differentiate their business processes, releasing a new wave of innovation.
Systems integration	Process integration	Instead of conforming to the static way that systems function, a business will be able to configure and manage systems to meet changing needs, making the entire organization more agile.
Go-live	Continuous improvement	Releasing business process logic from static source code means companies will continually manage and improve how systems support the business.
Data capture	Data insight	Companies will move from a focus on data collection to a focus on data analysis that drives competitive insight.

[23] Currently, there are tight links between source code and process definitions, between process definitions and middleware, between enterprise software and feeder systems, and ultimately between the business processes themselves and the technology infrastructure. In short, users adapt business processes to fit the capabilities of IT, and attempts to expand those capabilities through customization often jeopardize upgrades. Loose coupling technologies define organizational activities in a standard form (e.g., Business Process Execution Language) and then store these activities in a "service repository" where they can be accessed through explicitly defined methods.

Loosely coupled IT will dramatically increase the potential for value creation by reducing the cost and difficulty of customizing IT. Decoupled hardware and software can be recombined to create a potentially infinite variety of customized processes, without affecting the ability to upgrade the underlying systems. Changing delivery models also present opportunities to change the cost dynamic and to deliver business process innovation tools on a massive scale.

For example, the "utility computing" model promoted by one of the pioneers in on-demand technology, Salesforce.com, employs a variable IT spending model to offer customers packaged functional capability to manage certain business processes. Another product, called Force.com, gives customers the ability to develop custom functionality through the on-demand channel in an upgradeable environment. While Salesforce.com's original value proposition delivered on-demand customer relationship management functionality, it now enables customers to create their own on-demand functionality, encouraging business process innovation on a scale previously unimagined. SAP, Oracle, and Microsoft have also made significant investments in various on-demand models, validating this delivery method's very compelling value proposition.

Recognize that an agile, open IT model requires safeguards

Taking advantage of the opportunity to purchase discrete IT services and combine them at will requires an agile, open IT model.[24] But such a structure adds to the potential for uncontrollable costs and new risks. Investment in SaaS, for example, is a prime candidate for generating more shadow IT spending because these investments often come from operational budgets, not capital IT budgets. Data security also becomes more challenging in an open model due to the nature of the extended infrastructure and the number and types of internal and external users.

That said, with leadership guided by a vision of IT as a value-enhancer, the potential for next-generation enterprise applications to shift IT's focus away from automating static departmental functions to creating value by supporting end-to-end business processes and innovation is undeniable. The recognition and realization of this opportunity is already driving the next cycle of IT value creation.

[24] For more on the development of more agile, open business models, see PricewaterhouseCoopers, *Breaking Down Walls: How an Open Business Model Is Now the Convergence Imperative (2006).*

A call to action

Corporate IT's growing consumption of financial resources will continue and accelerate. Shadow spending, slowing price declines, cost inflexibility, and IT's evolution towards a non-durable good have all contributed to the declining productivity of IT.

PricewaterhouseCoopers believes that the only way for companies to effectively reverse this trend is to manage IT's potential to create and sustain value, or competitive advantage.

Our original techonomics research suggests three high-level priorities that all C-level executives should focus on in order to drive high levels of IT value contribution to the organization.

1. Prioritize IT value management. To create differentiated business value, companies must focus simultaneously on managing IT costs and focusing IT investment on business processes that are sources of competitive advantage.

2. Manage out complexity. Complexity is the natural consequence of Moore's Law and shows up in many forms. Managing it out of IT will allow you to reallocate funds and higher levels of IT productivity towards innovation.

3. Manage in innovation. Using IT to create and support unique business processes and innovation may be the best and only way to generate sustainable value from IT spending over time. Software, delivery models, and architectures are providing the tools to release trapped value and drive new sources of innovation and differentiation from technology spending.

pwc.com/us

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

Bob Zukis
(213) 217-3222
bob.zukis@us.pwc.com
Los Angeles

Gary Loveland
(949) 437-5380
gary.loveland@us.pwc.com
Orange County

Paul Horowitz
(646) 471-2401
paul.j.horowitz@us.pwc.com
New York

Gerard Verweij
(617) 530-7015
gerard.verweij@us.pwc.com
Boston

Brad Bauch
(713) 356-4536
brad.bauch@us.pwc.com
Texas

Recycled paper

This publication is printed on Mohawk Options PC. It is a Forest Stewardship Council (FSC) certified stock using 100% post-consumer waste (PCW) fiber and manufactured with renewable, non-polluting, wind-generated electricity.