Industry views

Embracing change in the technology industries*

Technology executive connections
Volume 1

*connectedthinking

PRICEWATERHOUSECOOPERS

The survey

The quantitative findings presented in this report are based on a survey conducted by the Economist Intelligence Unit (EIU). The survey garnered 126 responses from senior executives based in Europe (39%), Asia (29%), North America (26%), the Middle East and Africa (4%) and Latin America (2%).

The interviews

Thirteen in-depth interviews with senior technology executives were conducted in conjunction with this report. In particular, we'd like to thank the following "on record" interviewees:

John Becker
CEO, Cybertrust

Stephen Brobst
CTO, Teradata

Joel Cawley
Vice President of Corporate Strategy, IBM

Markus Kajanto
Director of Corporate Strategy, Nokia

Tim Matlack
Head of Consultancy, Wipro Technologies

Sonia Miller
Founder and President, Converging Technologies Bar Association

Billy Moon
Distinguished Engineer, Cisco Systems

Maria Tagliaferro
Corporate Communications Director, Analog Devices

Dr Louis Tomasetta (PhD)
CEO, Vitesse Semiconductor

Christine Wallis
Senior Vice President of Global Strategy and Planning, Hitachi Data Systems

Emil Wirsz
Head of Strategic Marketing, Health Sector, Corporate Technology Group, Siemens

About PricewaterhouseCoopers

The firms of the PricewaterhouseCoopers global network (www.pwc.com) provide industry-focused assurance, tax and advisory services to build public trust and enhance value for clients and their stakeholders. More than 146,000 people in 150 companies across our network share their thinking, experience and solutions to develop fresh perspectives and practical advice.

Achieving sustainable change is complex and difficult. While some people believe that you need to manage people through change, PricewaterhouseCoopers believes that you need to manage change through people. We work with many of the world's most successful organisations to put their people at the heart of designing, managing and executing lasting change.

PwC works with technology companies around the world to help them fulfill the promise of their great ideas. We are the trust advisory and auditory to the majority of the Financial Times technology companies.

We have made a major commitment to train our people in industry-specific issues so that we can delivery services with a global perspective, local implementation, in-depth experience and a forward-thinking approach.

While there is an ever-present state of change and evolution in the technologies industries, PwC's ability to add value is a constant.

Welcome to the Technology Executive Connections series

Technology Executive Connections is a series of reports designed for executives in the technology industries to assist in exploring, understanding and sharing ideas on today's pressing business and strategic issues. Our unique combination of a broad, online, worldwide survey of senior executives and in depth one-on-one interviews with industry leaders around the globe allows the Technology Executive Connections series to gauge the climate within the industry, gain insights into current views and opinions, and promote leading analysis of current issues.

This issue focuses on the constant state of change due to ever-evolving technologies and increasing customer sophistication. Many executives are confident of their companies' ability to successfully manage change, having survived massive market changes already. Most agree that the top drivers of change are customers, but also realise that change can come on many fronts. A final point of note, executives say developing the right partnerships is key to a company's ability to respond to change quickly and appropriately.

Other topics that this series has explored to date include: digital convergence; talent management; changing intellectual property strategies; and the effect of rising demand for green products and operations. For additional copies of this report or any of the others in the series, please visit www.pwc.com/techconnect.

We hope this report provides interesting, thought-provoking reading to you and your colleagues and that it kindles discussions about how you're addressing the constant changes your company faces. We welcome your thoughts on the issues we've addressed herein as well as your ideas and suggestions for future topics to explore. Please feel free to contact us about this series via email at techconnect@us.pwc.com.

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Introduction

Ferocious competition, ever-evolving R&D, compressed product life cycles, increasingly demanding customers, emerging markets—change in the technology industries appears never ending.

Yet amid constant flux, technology executives express confidence in their ability to manage and to succeed. Evidence from 13 in-depth interviews and an online survey, conducted in 2005 by the Economist Intelligence Unit of 126 executives in the technology industries worldwide, shows that the technology industries believe they are learning how to adapt, survive and possibly thrive amid great change. In short, these executives tend to see themselves and their organisations as masters of their own destinies. The technology industries are defined here as IT hardware, software, IT services, semiconductors, biotechnology and telecoms equipment.

Are these executives' heads in the sand? Or have technology companies developed enviably competent strategies, skills and processes to drive, respond to and profit from the changes around them? While we certainly do not believe industries' leaders are taking an ostrich-like approach to the future, historically, technology companies have had a mixed record in anticipating the dramatic changes. Today's executives have now learned to expect the unexpected.

The following report examines the survey and interview findings and summarises the research into four principal observations. At the end of each observation, there are some questions that executives might ask themselves about their own organisation's ability to manage change.

The four principal observations are:

Executives express confidence in their businesses amid slowing but still profound industry changes. Many respondents downplay the unpredictable and potentially volatile nature of change.

A number of respondents say that the arrival of the Internet and related networking technologies is the most important global economic and social development of our time. From now on, they say, the Internet will evolve, though less disruptively than in the past 10 years. Executives say there is less likelihood of a technology change in the next 10 years similar in scope to the impact of the Internet. High-tech companies, in fact, believe they are well positioned to profit from change. But does a slowdown in the pace of technology change herald a much wider business revolution? Will the industrialisation of IP technologies lead to a dramatic change in business models, working practices and customer demands?

The top drivers of change are customers, customers and more customers.

Executives in the high-tech industries view the adoption of customer-centric business strategies as critical to their ability to identify, respond to and profit from change. A customer focus attracts the highest scores in virtually every category of objectives and practices tested by the survey. Most interviewees underline this point, citing strongly customer-focused approaches and successes. High-tech executives say they view customers as partners and partners as customers. Understand your customers, view evolving technology from a customer's perspective, focus execution and service delivery on a customer's needs—and the enterprise will ride the crest of any wave of change. But will technology organisations find that their customers demand greater and more complex changes than those they have lived through in the past 10 years?

Don't go it alone.

No single technology company, whether massive or minuscule, can do everything on its own. Partnerships and alliances, already a defining feature of the technology industries, will continue to evolve and proliferate. But this degree of co-operation inevitably leads to challenges as today's partners pursue new technologies or are swallowed by direct competitors. The ability to manage partnerships is becoming an ever more essential discipline. But can technology executives thrive in a complex ecosystem of competition and collaboration where dependency, opportunity and threat continually co-exist?

Change comes on many fronts.

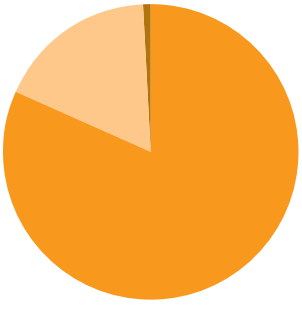
The technology industries believe their core competitive advantage depends on profiting from change. But doing so requires more flexible strategies, business models and cultures capable of managing rapidly evolving risks. Executives remain confident that their organisations, already flexible today, will become even more so in the coming decade. But is it reasonable to believe that these very large organisations can capably and consistently institutionalise change?

The remainder of this report examines each observation in greater detail.

Observation one:

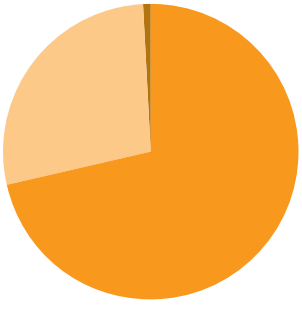
Executives express confidence in their businesses amid slowing but still profound industry changes. Many respondents downplay the unpredictable and potentially volatile nature of change.

Figure 1—How would you describe the degree of change in business conditions experienced by your company over the past 10 years?



81.7% Profound change
17.5% Moderate change
0.8% No change

Figure 2—What degree of change do you anticipate over the next 10 years?



71.4% Profound change
27.8% Moderate change
0.8% No change

All organisms change. Not all organisms survive. But technology executives appear confident in their companies' ability to understand, evolve and thrive. Encapsulating these beliefs and attitudes is a statement from Emil Wirsz, head of strategic marketing for the health sector in the corporate technology group at Germany's Siemens. Succinctly, he states, "Our business is change."

The first sets of statistics from our survey of 126 executives reveal two principal and pervasive findings. First, counterintuitive as it may seem, the survey shows that a growing number of executives perceive that the pace of change in their businesses is actually slowing. Second, technology executives report that relative to the past 10 years their organisations' ability to manage change will be somewhat improved over the next decade.

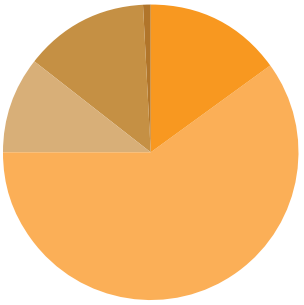
Less change?

Change is relative. But executives in our survey say they expect the pace of change to slow over the next 10 years. Specifically, respondents were asked to describe the degree of change in business conditions experienced by their companies over the past 10 years relative to the expectations for the next 10 years. While 82% describe change over the past 10 years as profound, the figure declines to 71% anticipating profound change over the next 10 years. (Figures 1 and 2.)

The finding from the survey about the slowing pace of technological change is borne out by the qualitative interviews. Essentially, many executives believe that the Internet and its related technologies moved from promise to practice between 1995 and 2005. Changes in the technology industries will be extensive over the next 10 years, but not quite as profound as in the previous 10.

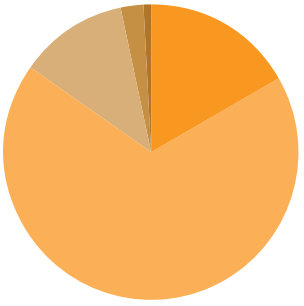
Joel Cawley, IBM's vice president of corporate strategy, offers support for this view. Cawley admires the work of Carlota Perez, an economist at Britain's Sussex University who has studied the impact of the steam engine, the car and the airplane on business and society. "What you find," says Cawley, "is that every significant technology goes through an early

Figure 3—How capably has your company dealt with the business changes of the past 10 years?



15.2%	Highly effectively
60.0%	Somewhat effectively
10.4%	Neither effectively nor ineffectively
13.6%	Somewhat ineffectively
0.8%	Highly ineffectively

Figure 4—How capable do you believe your company will be in managing change over the next 10 years?



16.7%	Highly effectively
68.3%	Somewhat effectively
11.9%	Neither effectively nor ineffectively
2.4%	Somewhat ineffectively
0.8%	Highly ineffectively

eruption, a bubble, a crash and then post-crash. What you see is a sustained period of societal and institutional adoption and integration."

Perez says that technological revolutions have two stages. The first, which she calls the 'installation period', is one of exploration and exuberance. Engineers, entrepreneurs and investors all try to find the best opportunities created by a technological big bang, such as Ford's Model T in 1908 and Intel's first microprocessor in 1971. Spectacular financial successes attract more and more capital, which leads to a bubble. This is the 'gilded age' of any given technology, 'a great surge of development', as Perez calls technological revolutions.

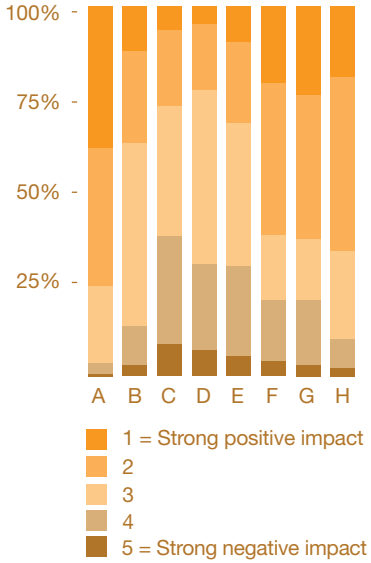
In the second, or 'deployment', period, the leading firms of the new economy become bigger and slower. The emphasis is no longer on raw technology, but on how to make it easy to use, reliable and secure. Perez's work indicates, says Cawley, "that it's this latter phase we're in now, where digital technology has taken hold and is understood, embraced and is now widely dispersing throughout business and society worldwide." So, according to Cawley, it's not surprising that in spite of a "zillion technologies moving off in all directions," the overall statistics show a significant slowing of expected change in the technology industries.

But are these expectations realistic? For one thing, changes to the overall business environment might accelerate as technology, such as the Internet, diffuses through society. Still others point out that executives may be discounting the change inherent in such unknowns as global terrorism; the economic rise of China, India and Brazil; and a potential shortfall in or disruption of global energy supplies. As a senior executive from a large Japanese technology company explains, "Change has been very dramatic—and the reality is we are very pleased with our successes in technology over the past 10 years." However, continues the executive:

We would be very hesitant to say that the pace of change will slow over the next 10 years. We have much optimism and we see the potential for sustained and even explosive growth in many technologies and products and in many markets worldwide. We believe there will be many, many new consumers for our products. But we must recognise and appreciate that we are also in a period of great political instability and risk. We are optimistic, but it would be a mistake to say the potential for change, on a grand scale, is slowing.

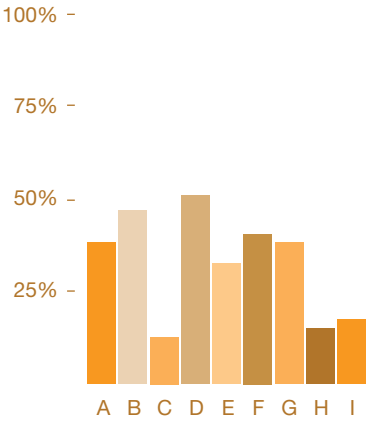
In the end, says Cawley, at least one driver of change is becoming if not less volatile then at least more clearly understood. "Society and business are used to this [Internet epoch] and it's no longer threatening but rather more enabling." But given so many additional potential sources of change and risk, the essential best practice, says Cawley, "is to develop business processes and strategies along with a business culture that takes massive change as a given."

Figure 5—In the coming decade, what will be the direction and magnitude of the impact of the following trends/realities on your company?



A Convergence in digital services
B Convergence in biology/ engineering
C Cyberterrorism
D The war on terrorism
E Rising energy prices
F China's economic emergence
G India's economic emergence
H The EU's economic expansion

Figure 6—Which of the following have been vital in helping your company manage change over the past 10 years? Select three choices.



A Flexible sourcing/ manufacturing
B Collaborative partnerships with other technology companies
C Collaborative partnerships with companies from other industries
D Collaboration with end-users and customers
E Flexible, change-conscious workforce
F Close customer relationships
G Flexible, scaleable IT
H Flexible balance sheet/ cash flow
I Commitment to open standards

Change as a way of life

Here, regardless of their expectations concerning the magnitude of change to come, technology company executives report that relative to the past 10 years their organisations' capabilities going forward will be improved. They believe they are becoming or have become *more* capable in terms of managing change. Whether their optimism is borne out by events remains to be seen. Given the mixed track record of firms in the technology industries, a dose of skepticism seems necessary (Figure 3).

According to the technology executives surveyed, change in technologies, in partnerships, in customer relationships and in economic fundamentals is becoming a way of life. Technology executives in the survey are cautiously optimistic about their ability to manage business changes: 17% say they will be highly effective in doing so over the next 10 years, compared with 15% in the past 10 years. And 68% say they will be somewhat effective in the next decade, against 60% in the previous one. In addition, the number of companies that describe their performance in managing change as somewhat ineffective decreases from 14% to only 2% (Figure 4).

The impact of change

The survey also tests executives' expectations regarding the relative impact of a number of commercial and societal trends. The results suggest that respondents are optimistic even about some of the most dramatic shifts in technology and demographics.

For example, 75% of executives say that digital convergence will have a positive impact on their companies (the top two positive responses garnered 38% and 37% respectively). But not to be overlooked are their expectations of economic expansion in India, China and the European Union (EU). All three scored high in terms of their expected positive impact on respondents' companies. Meanwhile, negative issues and trends such as global terrorism, rising energy prices and even cyberterrorism seem to weigh lightly on the minds of most executives. Are they being too optimistic (Figure 5)?

Whether realistic or not, the self-assessed improvement in organisational effectiveness and hence confidence in managing change are due primarily to a handful of evolving business strategies and processes. According to the survey, companies indicate they are relying on a number of organisational tools to improve their ability to gauge and manage change. Here the survey indicates the relative effectiveness of these tools.

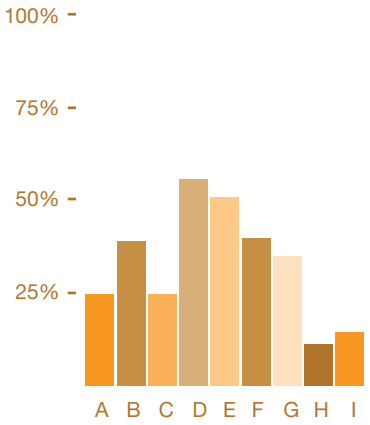
For example, respondents were asked to choose from a list of strategies those that had proven most effective over the past 10 years in terms of managing change. The most frequently cited include collaboration with end-users and customers (51%), collaborative partnerships with other technology companies (47%) and close customer relationships (41%) (Figure 6).

Priorities are expected to change in the future. Collaboration with end-users and customers retains the top position in terms of frequency of citation (56%), but the need for a flexible, change-conscious workforce moves up from sixth to second place (51%) (Figure 7).

The importance of a customer focus is a particularly strong and recurring theme throughout the survey. For example, when asked which mechanisms were viewed as the most effective in terms of navigating or profiting from change, both in the past and in the future, customer relationships and interaction claim the lead position, followed by CEO leadership (Figures 8 and 9).

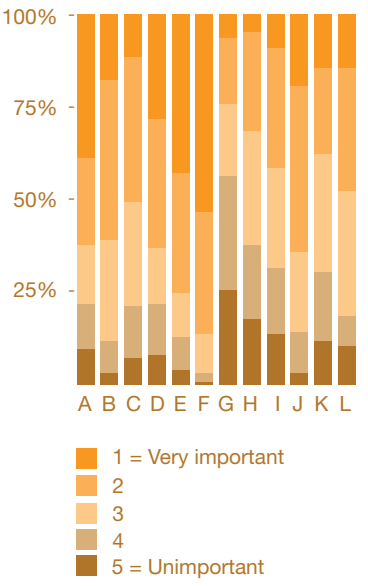
There is a change in priority among the other mechanisms, however. Over the coming 10 years, the role of strategic acquisition/partnerships, internal training and employee recruitment and retention all gain in importance. But in the end, the trend is clear: Technology executives view customer relationships as the principal driver of their ability to manage change.

Figure 7—Which of the following do you expect will be vital in helping your company manage change over the next 10 years? Select three choices.



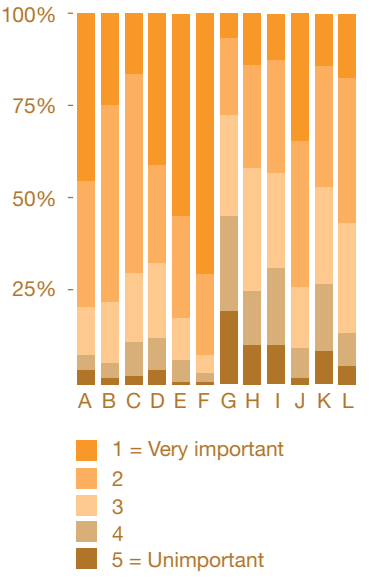
A Flexible sourcing/ manufacturing
B Collaborative partnerships with other technology companies
C Collaborative partnerships with companies from other industries
D Collaboration with end-users and customers
E Flexible, change-conscious workforce
F Close customer relationships
G Flexible, scaleable IT
H Flexible balance sheet/ cash flow
I Commitment to open standards

Figure 8—In the past 10 years, how important were the following mechanisms in enabling your company to navigate and profit from change?



A Strategic acquisitions/ partnerships
B Internal training
C Performance evaluation/ reward frameworks
D R&D
E CEO leadership
F Customer relationships/ interaction
G Political lobbying
H Open systems
I Supply-chain initiatives
J Employee recruitment/ retention
K Participation in setting standards
L Vertical industry specialisation

Figure 9—Over the next 10 years, how important will the following mechanisms be in terms of enabling your company to navigate and profit from change?



A Strategic acquisitions/ partnerships
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E CEO leadership
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I Supply-chain initiatives
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L Vertical industry specialisation

PwC connections

Manage change through your people

Survey respondents showed high confidence that they'll succeed amid slowing but still profound changes to the technology industries. Are they downplaying the unpredictable and potentially volatile nature of change? Or did the game-changing impact of the Internet and other market developments over the past decade hone their survival skills in an environment of constant change?

Everyone chuckles at the past predictions on the impact of technology. Sixty-five years ago, Thomas Watson, chairman of IBM, predicted a world market of five computers. Twenty-five years ago, Bill Gates mused that "640K ought to be enough for anybody." These predictions taught us to never underestimate the potential effect of changing technology or markets. We must imagine the extreme impact. Then double it.

Cognizant of this lesson, many of today's successful technology companies feel they can anticipate and react quickly to the acute influences of new markets and technologies. That's why their confidence is high. But high confidence doesn't guarantee success.

PwC has found that 9 out of the 10 top barriers to change are people related. Moreover, our client work has shown that issues such as workers with limited change management skills or generally poor communication across the organisation can negatively impact everything from capital structure and tax-efficiency to IT effectiveness and risk management. In fact, to manage change successfully, companies need people-driven principles and processes that can guide the organisation from its current to its desired state. PwC's Framework for the Delivery of Benefits and Management of Change is one example of a comprehensive approach for incorporating people-driven strategies and tools.

To view this framework or for related information on how we help technology clients anticipate and navigate the currents of change, go to www.pwc.com.

Questions for further reflection

What aspects of change are slowing and which ones are either moving at the same pace as before or accelerating? Could it occur, for example, that change in the technology industries might slow, but accelerate for business in general?

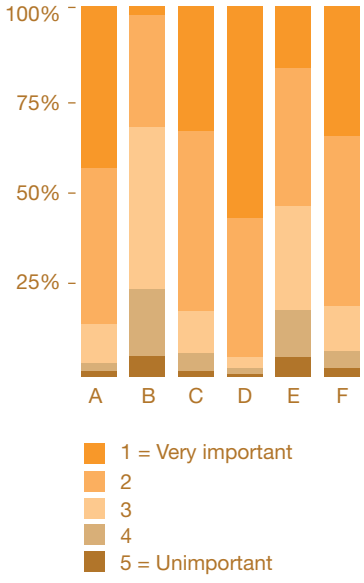
To what extent is your organisation capable of changing? What specific aspects of your business provide evidence and confidence that your organisation is identifying and capably responding to or driving change?

Where are your potential blind spots? What are the principal impediments to identifying and implementing needed change in your organisation? What are the greatest sources of corporate inertia?

Observation two:

The top drivers of change are customers, customers and more customers.

Figure 10—How important are the following capabilities for managing change?



A Building alliances with appropriate partners
B Building alliances with competitors
C Balancing initiative and innovation with teamwork, focus and control
D Collaborating with customers to identify new opportunities
E Collaborating with industry groups to establish effective standards
F Training employees to manage change

As the Internet gained in popularity in the 1990s, it became common to distinguish between the 'old economy' and the 'new economy', symbolised by the proliferation of dot-com start-ups of every conceivable stripe. Now, nearly 10 years and a burst bubble later, the industry has returned to basics—an unwavering focus on customers.

A dominant focus

The technology industries' strategic emphasis on catering to customers can be seen in many answers in the survey. For example, respondents were asked to rate the importance of a range of strategies for managing change. By far the most valued strategy—collaboration with customers to identify new opportunities—rates a '1' (or 'most valuable' strategy) with 57% of the sample (Figure 10).

In another question, respondents were asked to say whether they agreed or disagreed with a handful of strategic statements. Again, statements relating to the importance of customers attract the strongest levels of agreement, garnering the highest and second highest ratings from 82% and 75% of participants, respectively (Figure 11, E and F).

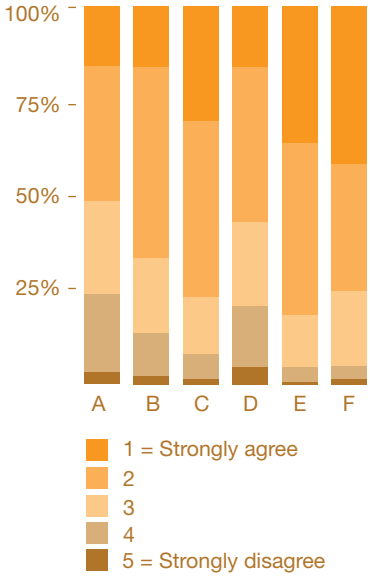
Connecting with customers

Interviewees virtually all agree that the quality of a company's connection to its customers is directly proportional to its ability to anticipate, respond to, manage or even drive change. As IBM's Cawley explains, in the mid-1990s, "it's safe to say we were experiencing some tough going." Soul-searching, the company began asking customers what they really needed from IBM, says Cawley. Their answers, he explains, "ultimately required us to make a lot of hard trade-offs in technology and divestment." But at the end of the corporate reinvention,

“If I had to point to a single set of initiatives over the past 10 years that could help explain our recovery from near death, I’d say the first step was reconnecting with customers.”

—Joel Cawley, Vice President of Corporate Strategy, IBM

Figure 11—To what extent do you agree with the following statements regarding the coming decade?



A Government regulators will tend to inhibit technology development, adoption and usage.
B As multiple disciplines collide through the process of convergence, industry groups and end-users need to more aggressively collaborate to develop common lexicon and standards.
C Today’s laws and regulations are not sufficiently internationalised or up to date to govern converging technologies.
D The reliability of Moore’s Law (for example, computer processing power will continue to double every 18 months) will survive another decade.
E The greatest challenge for the technology industry is learning to more effectively collaborate with customers.
F In the past we organised around technologies; in the future we will organise around customers.

the formerly manufacturing-intensive company emerged “as a services business, intertwined with and relevant to our customers.”

The importance of having a customer focus is repeated throughout the qualitative discussions. In fact, “we have a saying that the reason we’re smart is because we have really smart customers and we listen really hard,” says Stephen Brobst, CTO of Teradata, a division of NCR and a leading data warehousing provider.

But this connection to customers is much more than a “CRM or a software solutions” approach, says Brobst. Rather, “this is a disciplined, interactive, evolving, ongoing and, in the end, a tangible customer focus. For us, it’s a centrepiece of our technology strategy and our ability to manage change.”

What that means in practice, says Brobst, “is that it’s my goal to spend at least 50% of my time with customers and prospects.” For example, Brobst is an active participant in what the company refers to as its Partners Advisory Council (PAC). Teradata calls its customers “partners”, says Brobst, “because that’s what they are.” And PAC members regularly meet with Teradata teams in interactive, hands-on exchanges to discuss such matters as evolving needs or the prioritisation of features and functions. As for the PAC’s composition, “There’s representation from multiple industries, multiple geographies, there’s companies of all sizes, and everything we learn from that gets integrated with our R&D and everything else that we do. We take this very seriously.” Moreover, says Brobst, “that’s just one of many mechanisms we rely on for gathering input from customers.”

The ‘portfolio’ approach to change at Cisco Systems

Billy Moon, Distinguished Engineer, Cisco Systems

A number of executives interviewed for this report told how their companies endeavour to manage a portfolio of evolving technologies. However, one of the most intriguing portfolio discussions included linkages to both customer interaction and the management of change. To maintain its competitive advantage in technology, explains Cisco Distinguished Engineer Billy Moon, his company operates what is known as the Cisco Technology Center (CTC).

Customer-focused technologies

CTC employs a closely knit group of 50 or so highly trained and experienced engineers with diverse and complementary technology backgrounds. In turn, these engineers continually scan the frontiers of emerging and evolving technologies in tandem with likely customer needs to identify practical development paths and potential leading-edge products. Ultimately, the goal of this centre, says Moon, “is to understand innovation: where customers believe the market is going, how customers use what we already make and how customers might use what we could be making.”

The structure of this unit represents a unique approach to the seemingly contradictory objective of institutionalising change. First, the group defines “customers” in a very broad but still precise sense. As Moon explains, “we think of the business units [in our company] as our customers alongside the technology companies and partners that are using our equipment.”

Second, the group uses a portfolio approach to technology and product development. In the same way an investor manages risk by investing in a variety of asset classes, the technology centre focuses its development on a broad array of technologies. “We focus on macro areas of emerging technologies to make sure we’re in step with advances.” Then, within each set of macro technologies, “we look at the different time horizons, risks or paybacks to make sure we have development in place for the short-, medium- and long-term opportunities presented—and to make sure there are no gaps.”

Some of the macro technologies, analogous to asset classes, currently in the CTC portfolio include Layer 4-7 switching, everything on demand (EOD) and pervasive networking. As important as innovation may be, however, the focus is on “technologies we can deliver profitably,” says Moon, and in this case, pervasive networking is already beginning to pay dividends. “With pervasive networking, we looked out into the future and asked, ‘What if every device, human and thing was hooked to a network all the time?’ We called together thought leaders, partners and customers to figure out what processes might evolve, what needs, protocols, hardware or whatever else customers would need in that environment. Then we addressed the gaps in our product portfolio.”

Selling the concepts

The CTC may identify the opportunities, but it is up to Cisco’s business units themselves to decide what does and doesn’t make sense. As Moon explains, “we share what we know and what we can do, but it’s up to the business units to decide what to pursue, and that means the technologies have to make sense from a business-case perspective.” Moon adds, “these are our internal customers, so even though we might see the business case, they still need to be sold on the concept.”

PwC connections

Harvest customer knowledge

Should companies rely on customer intimacy as the best compass for guiding change in strategies, technologies and processes, as the study indicates? Yes, but only if they have the processes and connections in place to accurately translate that relationship into meaningful and actionable knowledge. Otherwise, the result is lots of data but no information.

Technology enables businesses to interact with their customers to a breadth and depth unthinkable since the corner grocer was on first-name basis with our grandparents and knew their likes and dislikes. Today, businesses mine and manage megabyte upon terabyte of information on customers' wants and needs. How can companies efficiently make sense of this fire hose of data? Combining and effectively using customer knowledge is a key to success. Companies must translate customer information into knowledge that drives business decisions. This requires that they first focus on the hard work of managing data, information technology systems and operations—one of the top expenditures in most large corporations.

Effective IT programmes link systems and operations to strategic business drivers—like understanding the customer—all while managing IT cost and value. It's a delicate but powerful balance that requires the right incentives to synchronise IT management with the company's most relevant knowledge stakeholders. Simultaneously, organisations must develop mechanisms to keep customer information secure. Not only is this essential for compliance with myriad regulatory requirements, but also companies must earn the trust of their customers before they become willing to share valuable intelligence.

For more information on how we help technology clients successfully harvest customer knowledge in a world of constant change, go to www.pwc.com.

Questions for further reflection

How capably does your organisation interact with and learn from its customers? Are there mechanisms for analysing and sharing this information across business functions, geographies or other organisational lines?

Is customer feedback and analysis able to help identify appropriate strategic or structural changes needed at your organisation?

Do your customer relationship activities emphatically inform your R&D efforts, and vice versa? What are the mechanisms for channeling emerging customer needs and insights into decisions relating to investments in your portfolio of technologies?

Observation three:

Don’t go it alone.

When it comes to thriving amid change, customer focus and interaction score highest among survey respondents. But right behind is a robust recognition of the importance of partnerships.

Throughout the survey, capabilities surrounding partnerships consistently achieve a second- or third-place ranking. For example, 44% of the survey sample say building and maintaining alliances with appropriate partners is an extremely important capability (second only to customer interaction, which scored 57%—see Figure 10 on page 15).

Ephemeral ecosystems

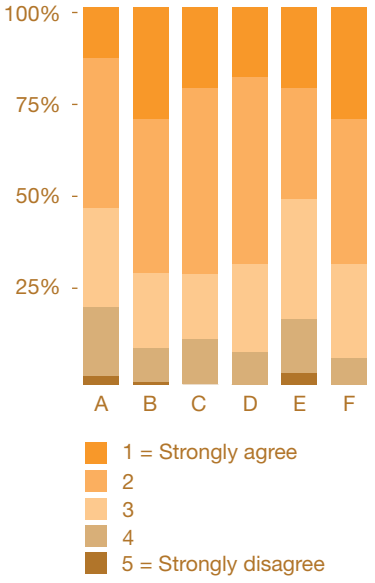
Whether large or small, collaborative initiatives are essential for sustaining success in high-tech.

Owing to the high cost of integration and development, high-tech partners are continually helping one another in identifying and addressing the needs of many sets of customers. As a result, most technology companies are involved in constantly shifting alliances.

“We have these very complex co-operative and sometimes competitive relationships that emerge and evolve and change,” says Christine Wallis, senior vice president of global strategy and planning at Hitachi Data Systems. Sometimes this takes the form of co-operation, but at other times it takes the shape of co-opetition. For example, at Hitachi Data Systems, “we have relationships with companies that resell our products, but that also compete with us in other areas,” says Wallis. Then “there are competitors who supply products to us that we resell, there are cross-technology licensing agreements, and all of these relationships are in a constant state of change. It’s a complex and yet critical set of relationships.”

Add the widespread phenomenon of industry consolidation and the alliance/partnership picture becomes even more complicated. “Great technology is not enough to survive. Companies must have global reach, a diverse portfolio of offerings and a sound network of partners to create sufficient critical mass in the market,” says John Becker, chief executive of Cybertrust, a provider of information security. “A small company can emerge

Figure 12—To what extent do you agree with the following statements regarding the coming decade?



A Small or start-up technology competitors with new products and/or business models will present a greater strategic challenge than established technology competitors.
B Small or start-up technology competitors are more likely than larger, established companies to create breakthrough products or business models.
C Relative to smaller organisations, large technology-focused companies will have greater resources, scale and breadth of capability to exploit convergence.
D As digital, biomechanical and other convergence scenarios advance, cross-industry competition will intensify.
E The emergence of revolutionary business models (such as Dell, Amazon) will pose significantly greater competitive threat than industry consolidation.
F The technology sector will become one of the principal drivers of wealth creation.

with really leading-edge technology, but without the access to the markets, partners and customers available to larger companies it may be hard to gain significance in what is a very crowded segment."

Indeed, the survey shows that 70% of executives agree with the statement that small or start-up technology competitors are more likely than larger, established companies to create breakthrough products or business models (Figure 12).

Today's partner; tomorrow's competitor

Companies clearly understand the need for partners—and the risks involved. As Teradata's Brobst explains, "today there are some tricky and constantly evolving relationships. Co-operation today can become co-opetition overnight." For example, explains Brobst, "we work closely with and we have a large number of customers who use Ascential [an IBM subsidiary that supplies data integration software], and their data feeds into Teradata." In addition, Brobst is a close associate of Ascential's CTO, and "in fact he was right next door to me at MIT [Massachusetts Institute of Technology]."

But Ascential has just been acquired by IBM, a company that has at least one major division that competes directly with Teradata. So his company needs to determine, says Brobst, "whether Ascential will become a part of IBM's [proprietary] DB2 technologies, or whether it will land in their open systems infrastructure play, Websphere." If the former, says Brobst, "that will add some challenges to the relationship" with Ascential.

Still, collaboration with partners—even with potential competitors— is essential in today's technology markets. "We used to look to customers to drive pieces like prioritisation of features or functions," continues Brobst. But, increasingly, "partners play an equal if not sometimes greater role in driving our development and R&D." Fundamentally, says Brobst, "there's no clear distinction between partners and customers. They're all partners."

Perhaps the most intriguing aspect of the new world of co-operation and co-opetition is the required and resulting openness. "Today you have to learn to play well with others," says Brobst. For example, five years ago, "we'd develop everything right here within our own four walls and later on we'd publish something saying 'here's how we've engineered our interfaces—that's what you'll need to know to get access to Teradata,'" explains Brobst. Today, however, "I'm spending more and more time doing road maps and engineering reviews and other very detailed stuff with partners. We in fact have a whole lab with a great deal of capital and people investment, and all they do is collaborate with partners."

The bottom line, says Brobst:

Our partners sometimes work with our competitors, and sometimes we work with their competitors. At some level, some of this information has to rub off and get shared in places we'd rather it wasn't. Certainly collaboration and co-opetition is more comfortable in some places than in others. But there has to be some level of sharing and that means you have to rely on people's integrity—you have to form trusting relationships. You can't be in a position where anyone who wants to work with you needs to build a customised interface in every instance.

Open-source collaboration at IBM

Joel Cawley, Vice President of Corporate Strategy, IBM

Only 14% of survey respondents view participation in open standards as an important element of their organisations' change initiatives (see Figure 10 on page 15). Nonetheless, interviewees suggest that given the economics of open-source collaboration—lower costs and reduced risks—this approach to the development of technology appears to pay large dividends.

As Cawley of IBM explains, "We were skeptical going into this. But today, the outcome of our journey into open systems offers some rather interesting lessons into how a large, conservative, proprietary technology-oriented organisation can succeed by doing the opposite of what it had always done before."

It was in the mid-1990s that IBM first became involved with open-source Apache programming. Back then, says Cawley, "We still thought we were in hardware, not services or solutions, and even as we were exploring this idea, we thought the open-source communities might reject us. We had no experience collaborating this way, no track record and a very limited understanding of the legal and IP regulations." But the initiatives went forward, says Cawley, "because we had no presence and therefore very little risk. It was pure opportunity."

What IBM learned, however, is that the economics of open-source collaboration provide large potential rewards. "The rule of thumb is that in order to build a highly reliable, commercially viable platform, it takes US $500 million in ongoing development investment," says Cawley. But in the open-source world, "OSDL estimates total Linux development of around $1 billion, of which IBM spends around $100 million, with half of that going into the platform, and the other half being used to develop IBM device drivers or other dedicated tools for us to sell into the market and service." Though best known for its role in Linux, IBM is currently involved in more than 120 collaborative open-source projects including platforms such as Apache, Eclipse, Derby and Globus.

Overall, says Cawley, "In the open-source world, you can get a robust platform, tailored to your needs, for a mere fraction of the investment. It's an amazing phenomenon, and people are just waking up to it." In fact, says Cawley, "Even though the business model is completely different, we're using a similar economic approach working with partners in semiconductors—sharing the risk, a collaborative innovation model—and it's our view that these types of shared economics will be increasingly necessary in order to sustain investments in leading-edge technology while remaining competitive."

Of course, there are challenges. "All of this runs counter to hundreds of years of patent practice," says Cawley. "But the intellectual property rights, though tricky, can be balanced; and you can get involved in licencing agreements and patent grants and so forth." But reduced risk, lower investment and yet leading-edge results "make open source a very viable, very scaleable, very profitable approach. This will be a growing phenomenon even with larger companies."

PwC connections

Partner for success

Partnering for success sounds like an easy mantra to adopt, but do technology executives actually have the means to manage a complex web of collaborative and at times competitive partnerships? Let's face it: When the enormous resources of two boardrooms are combined in a volatile world of new technology and market opportunities, great potential is a natural expectation. Yet some partnership arrangements thrive while others sputter and die. Why?

Experience shows that the road is usually bumpier for first-time partners. But even the most weathered executive can stumble in this constantly changing and increasingly multifarious world.

Partnering for success starts with determining the right deal strategy to help you achieve your goal. It's got to be flexible enough to adjust for the unexpected, aggressive enough to be competitive and yet broad enough to envision the challenges that will confront you from the moment the contract is signed. Start by considering the economic benefits and cost structure for each possible model. Whether that's a joint venture, an alliance, outsourcing, acquisition or other approach, be certain that the tax issues, legal risks, conflicts of interest, market fluctuations and all other critical variables are taken into account with each decision you make.

Next comes the critical due diligence. Problems arise when companies rush to the altar too quickly, only to find they have misjudged their partners' financial health, strategic objectives, capabilities or even level of commitment. Rigorous due diligence is an essential and yet often underemphasised component of effective partnership.

Finally, after a quick and effective transaction to seal the deal, best practice concentrates on rapid execution to drive the benefits. The most effective partnerships address the needed adjustments across the gamut of longer-term financial and tax structures, HR issues and controls within the first 100 days. Don't delay. Develop a plan to make the partnership succeed—then execute.

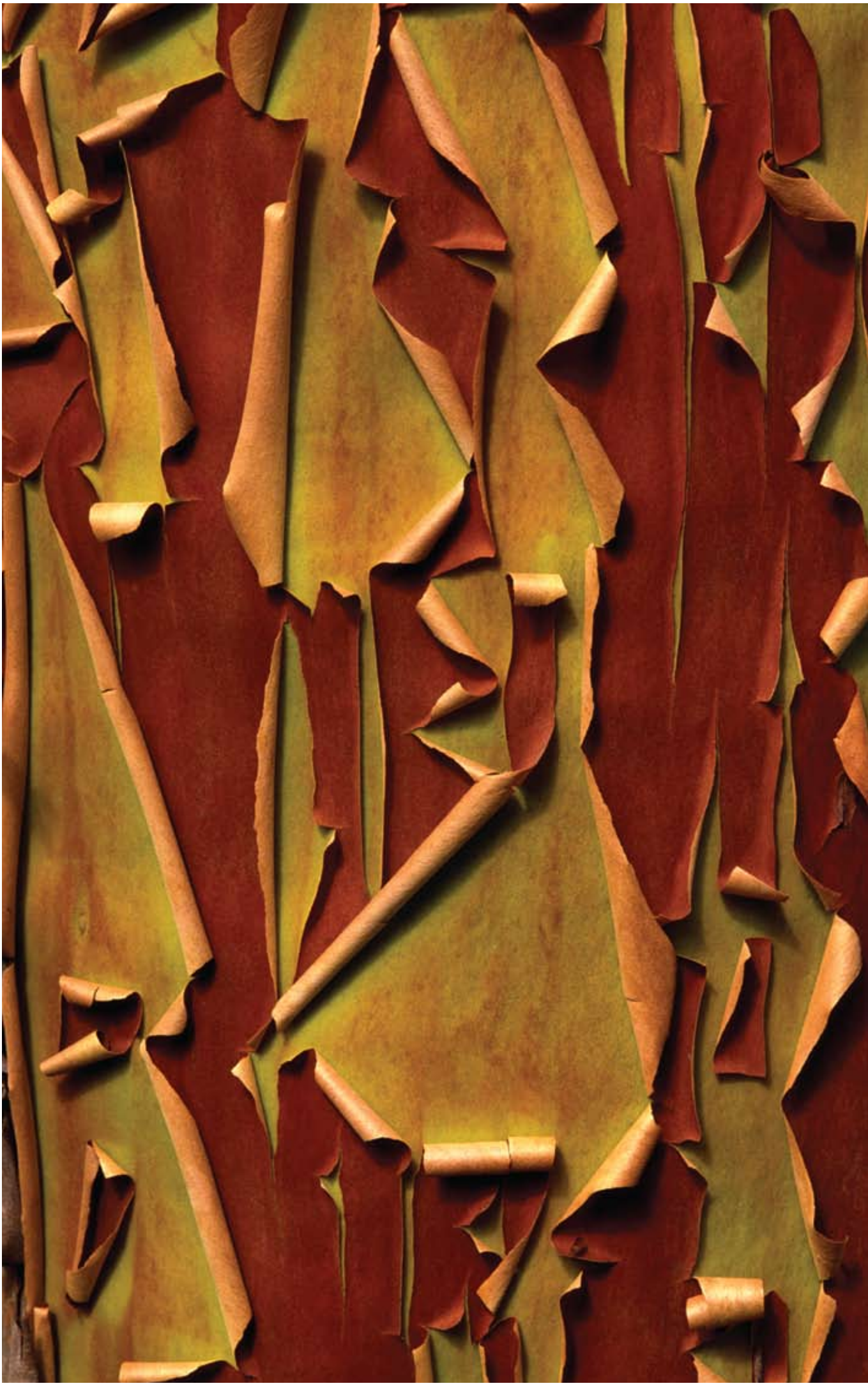
For more information on how we help technology clients partner for success amid great change, go to: www.pwc.com.

Questions for further reflection

What risks are inherent in such intimate collaboration? How are you balancing the benefits of collaboration against the need to protect intellectual property, to protect your own competitive position within a value chain?

What mechanisms are in place to assist your employees and representatives in determining which sets of strategic information can be appropriately shared in which circumstances with which partners? Does a reliable framework exist, or are these decisions made on a case-by-case basis?

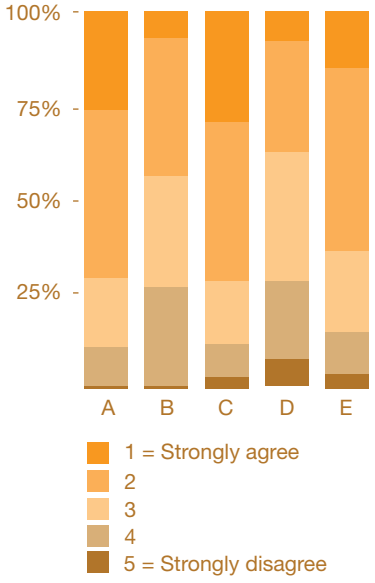
How do you gather and share customer intelligence with partners, suppliers, distributors, Value-Added Resellers (VARs) or other alliance partners? What incentives and rewards are gained by your organisation's partners?



Observation four:

Change comes on many fronts.

Figure 13—To what extent do you agree or disagree with the following statements regarding your company's attitudes, approaches and capabilities relating to change?



A Our company views change more as an opportunity than as a risk.
B Our workforce not only understands change, but embraces change.
C The ability to continuously manage change and its associated risks and rewards is a fundamental component of our competitive advantage.
D Our company has a comprehensive and disciplined approach enabling it to detect, understand, measure and dynamically/capably respond to change.
E We build flexibility into our partnerships, staffing and manufacturing arrangements, in order to better manage change.

As if dramatic evolution in partnership and customer strategies wasn't enough, executives must simultaneously evaluate and respond to a host of similarly profound issues. From the emerging markets of Asia to the growing competition for talent, regulatory hurdles and even cyberterrorism, executives face change on many fronts. Capitalising on fast-moving opportunities while avoiding pitfalls requires equal parts risk/opportunity assessment coupled with organisational dexterity. Consequently, executives indicate that they are both migrating towards more flexible management and decision-making structures while at the same time creating cultures that can more capably and rapidly assess and manage their most vital risks and opportunities.

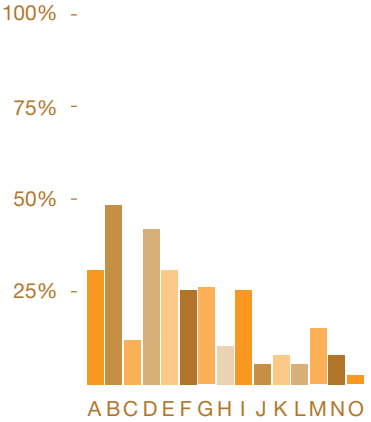
Change equals opportunity

As indicated earlier, executives are optimistic regarding their organisation's ability to profit from an era of change. In further support, 71% of respondents say they agree with the statement that their companies view change more as an opportunity than as a risk. Meanwhile, an identical percentage, 71%, agrees with a related statement: The ability to continuously manage change and its associated risks and rewards is a fundamental component of our comparative advantage (Figure 13).

But as executives clearly strive to embrace and even benefit from change, they meanwhile take stock of the potential risks of their businesses. The most frequently cited include competition from established companies (on 48% of executives' 'top three' lists), competition for talent/expertise (42%), and competition from new entrants, small or start-up companies (31%) (Figure 14).

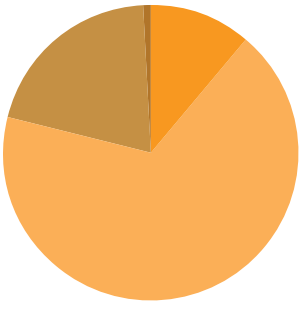
By contrast, asked to identify the most pressing risks for their individual segment of the high-tech industries as a whole, the 'top three' list becomes competition for talent/expertise (44%), government regulation (33%) and uncertain global economic conditions (31%). Other closely clustered industry risks include a failure to capitalise on opportunities, a lack of safeguards for intellectual property and a failure to identify/anticipate changing customer needs (Figure 15).

Figure 14—Over the next 10 years, what do you think will be the greatest risks faced by your own company?



A Competition from new entrants, small or start-up companies
B Competition from established companies
C Competition from other industries
D Competition for talent/ expertise
E Failure to capitalise on opportunities
F Failure to identify/anticipate changing customer needs
G Failure to respond to changing customer needs
H Failure to raise funding from the markets or other lenders
I Government regulation
J Outdated legal frameworks
K Lack of global industry standards
L Lack of safeguards for intellectual property
M Uncertain global economic conditions
N Uncertain national economic conditions
O Other

Figure 16—How would you describe the state of your company's strategies, processes, culture and other business model elements in terms of their ability to navigate change?



11.3% Highly adaptable
67.7% Fairly adaptable
20.2% Fairly rigid
0.8% Rigid

Building flexible business models and cultures

To manage these risks, the survey demonstrates that companies are recognising the need for greater flexibility in strategy, processes, culture and related elements of their businesses. For example, the results show that the number of companies that will be embracing highly adaptable business models nearly doubles (from 11% over the past 10 years to 21% over the next 10 years). At the same time, the number of companies exhibiting fairly rigid business models halves, from 20% over the past 10 years to 10% over the next 10 years (Figures 16 and 17).

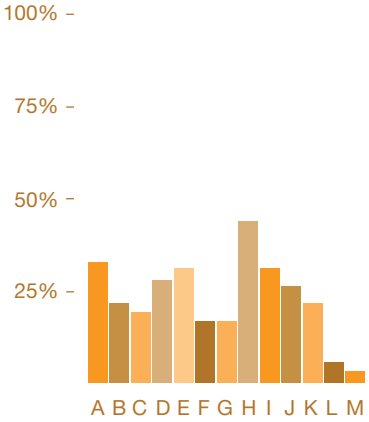
Interviewees agree that flexibility is vital in an era of rapid change. As Wallis of Hitachi Data Systems (HDS) explains, "The data storage industry changed dramatically in the past five years and it's still changing. So for us, one of the greatest challenges is helping individuals throughout the organisation, the culture, to be more accepting, more willing to change."

At HDS "we think of people's attitudes towards change as a bell curve," says Wallis. "At one end there are people who relish change and at the other are those who relish stability." Traditionally, says Wallis, "the middle of the bell curve is made up of people who can understand the fancy rhetoric surrounding the need to change and can adapt if they have to, but they find it pleasant only in small doses, and the truth is they still wish it would happen to someone else." In general, "it's very difficult to alter people's behaviours," says Wallis. But owing to such approaches as ongoing, consistent and optimistic messages from senior executives, the bell curve, says Wallis, "is starting to skew towards change."

While HDS is moving forward with an incremental programme of cultural change, other executives see value in an occasionally more radical approach. As Nokia's Kajanto explains, "We have always been capable and willing to change." But, back in 1998, the group saw the need for a shake-up and so embarked on a novel means of stimulating rapid innovation throughout the company. "One day several key people who reported directly to the CEO were told they would exchange jobs with someone else at the table," says Kajanto. "So, for example, the infrastructure would move to mobile phones and so on. Everyone would still report to the CEO, but what we wanted was to inject creativity and dynamism into the organisation."

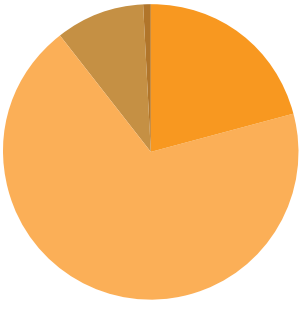
The results "were profound," says Kajanto. "When a person is given a new responsibility, that creates new thinking and energy. There was a great deal of innovation and so we were successful at injecting change." Nokia did not measure the success of the job exchange. However, says Kajanto, "If you look at the external performance of Nokia, you'll see it has been very good since this period." As for internal perceptions relating to the move, "most everyone will say we are faring very positively—it was a very good thing." As for similar moves in the future, "it's not something we're considering at the moment," says Kajanto, primarily "because the company now has a much better understanding and capability in managing change."

Figure 15—Over the next 10 years, what will be the greatest risks faced by your segment of the high-tech industry?



A Government regulation
B Outdated legal frameworks
C Lack of global industry standards
D Lack of safeguards for intellectual property
E Uncertain global economic conditions
F Uncertain national economic conditions
G Competition from other industries
H Competition for talent/ expertise
I Failure to identify/anticipate changing customer needs
J Failure to capitalise on opportunities
K Failure to respond to changing customer needs
L Failure to raise funding from the markets or other lenders
M Other

Figure 17—How well do you think your company's business model will adapt to change over the next 10 years?



21.0% Highly adaptable
68.5% Fairly adaptable
9.7% Fairly rigid
0.8% Rigid

Scramble for talent

Seen from the perspective of both the industry and their own firm, respondents rank competition for talent among the top three strategic challenges in the decade to come (Figure 14). But while interviewees acknowledge the importance of employee recruitment and retention, their individual experiences demonstrate that the size of this challenge varies both by company and by function.

"Competition for talent and discouraging turnover is always an issue," says Teradata's Brobst. "But the challenges for us aren't so much in technology as they are in the professional services organisation and sales surrounding data warehousing." There, says Brobst, "is where you get so much travel, pressure to make sales targets and salary competition, so there's a lot of churn."

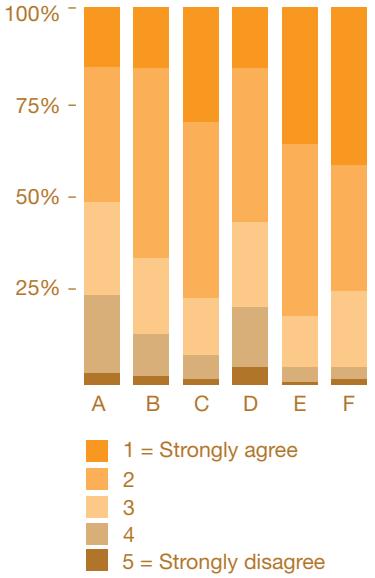
Meanwhile, at least in R&D at the company, "our turnover is negligible—next to zero," says Brobst. "Because our technology is so unique and so far ahead of whatever else is out there, what we find is that once someone works here, they can't—they don't want to—go anywhere else." Ultimately, says Brobst, "we're almost like a religious cult."

Yet another spin on talent and expertise comes from Hitachi Data Systems (HDS), provider of Application Optimized Storage solutions. Here, says Wallis, almost all of the company's R&D is based in Japan. "Hitachi, Ltd. has such a dominant position in the Japanese market," she says. "We have excellent traction, and that means we get the best and brightest in engineering and development." This means, however, "that our presence in the rest of the world is largely as a marketing, distribution and service organisation." So in the United States, for example, competition for marketing and services talent is fierce.

One challenge faced by HDS is its status as a privately held and wholly owned subsidiary of Hitachi, Ltd. "Other companies can offer stock options, and that's been a source of gnashing teeth and angst for us." But at the same time, she explains, the company is benefiting from recent market history. "A lot of stock options from a lot of high-tech companies now look like wallpaper—and it's times like these our employees are tickled because we pay in cash."

In the long run, says Wallis, "the best, most professional sales people just want to sell great products." Here, she explains, the company makes a practice of enabling its sales and support people to offer its customers an increasingly broad range of products and services, all within a solutions context. Not only does this keep things "interesting" for individuals, it also enhances their ability to understand customer needs in technology from a broader perspective. Overall, the solution for her company, says Wallis, "is staying on top with good compensation, and the best products and technology. That's the best way to hold on to the best people."

Figure 18—To what extent do you agree with the following statements regarding the coming decade?



A Government regulators will tend to inhibit technology development, adoption and usage.
B As multiple disciplines collide through the process of convergence, industry groups and end-users need to more aggressively collaborate to develop common lexicon and standards.
C Today's laws and regulations are not sufficiently internationalised or up to date to govern converging technologies.
D The reliability of Moore's Law (for example, computer processing power will continue to double every 18 months) will survive another decade.
E The greatest challenge for the technology industry is learning to more effectively collaborate with customers.
F In the past we organised around technologies; in the future we will organise around customers.

External resistance to change

Another broad set of challenges and opportunities centres on external resistance to change. According to Siemens' Wirsz, "I would say that internally there is not much resistance to change. In fact, we see change, advancing the quality and practice of healthcare, as our business. And not only in healthcare, we're a company that looks far into the future across a wide range of interconnected disciplines."

However, the market itself can be slow not only to recognise the value of advanced technologies but to adopt them. For example, "regulatory bodies can be hard to convince [in terms] of the need or the benefit of advanced technologies," says Wirsz. Obtaining approval for new approaches requires clinical trials to prove to regulators, health insurers and others not only that patients can be diagnosed and treated effectively, but also that economic value is gained.

Even healthcare providers themselves can resist improvements owing to the costs associated with continually migrating to new, more effective technologies. Similarly, many new technologies require new processes, and external customers can resist such changes. Consequently, explains Wirsz, Siemens continually improves its understanding of these external groups and works hard "to both address their needs and more efficiently address their approval requirements."

It may sound like an overwhelming set of challenges: technological, regulatory and current practice. But Wirsz says that the Siemens groups make progress continually:

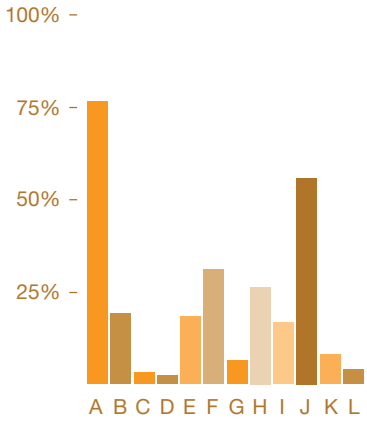
> We are engaged with our customers, with researchers and universities, with government agencies. Developing technologies that improve healthcare—that's what we do, that's our business, that's our opportunity. We build a road map of where technology can lead us, and then make progress every day. It is important business and it is all very manageable.

Legal impediments

Another potential set of risks is the lack of reliable legal safeguards. For example, 77% of survey participants indicate that today's laws are not sufficiently internationalised or up to date to govern such areas as converging technologies. Indeed, the state of case law and related legal frameworks is backward in such areas as patent grants, cross-licencing and other elements of partnerships and even co-opetition (Figure 18).

"Innovation historically advances at a faster rate than legal or regulatory bodies can sustain—and companies need to be aware of the issues and the risks," says Sonia Miller, founder and president of the Converging Technologies Bar Association, which
is based in New York. For example, consider convergence and nanotechnology. "Nanotechnology is multidisciplinary and interfaces with biology, physics, chemistry, engineering and computer science," explains Miller. Moreover, "there is no agreed-upon definition of nanotechnology, no uniform nomenclature, nor internationally valid standardisation for the huge variety of nanotechnological substances, materials, products or applications." Consequently, "one patent application may use

Figure 19—One hundred years from now, what do you think will be remembered as the biggest change event?



A The growth of the Internet
B The growth of e-commerce
C The emergence of reality television
D The success of Amazon.com
E The exponential rise in the processing power of computer chips
F The rise of information-driven consumer power
G Corporate scandals/ Sarbanes-Oxley
H September 11th and the war on terrorism
I The proliferation of cell phones/PDAs
J The rise of China
K The arrival of the euro
L Other

one set of words while a second may use another and yet refer to the same technology," says Miller. "This could have a chilling effect on innovation."

Meanwhile, patent examiners are specialised in a particular technology. So even as groups such as the US Patent Office take measures to train their examiners in fast-moving areas such as nanotechnology, they face an enormous challenge in achieving what Miller calls "cross-disciplinary versatility."

Cyberterrorism

Among the events that are having a decidedly negative impact on the high-tech industries are risks such as hacking, identity theft, Web site defacement and other acts of cyberterrorism. According to the survey, 38% of respondents consider these significant potential risks.

Here, John Becker, CEO of Cybertrust, offers his company's perspective on where the industry and corporations in general will need to move to combat such threats. "Y2K was a big event with a deadline, and so we saw everybody in a rush to address their issues," explains Becker. "The risk is clear: we are utterly dependent on technology—it's core to everything we do—but virus attacks went up by over 50% from last year and the financial impact on business is sharply rising."

Hackers, Web defacements, security breaches and related incidents are the new challenge. But the difference, says Becker, is that there's no drop-dead date and hence no real sense of urgency. Overall, he contends, "security is becoming an issue that won't be solved all at once, or perhaps at all. In the meantime, says Becker, "Companies need a strategy to reduce the risks of hacking, including plans for minimising potential damage."

China

An opportunity of enormous importance is the economic ascension of China. With its stores of engineering talent and low wages, this nation has long been regarded as a source of offshore manufacturing and engineering skills.

However, today, companies need to recognise "that China first and foremost—but I would add India next, then Brazil—over the next 10 years, they will all become enormous consumer markets," says Tim Matlack, head of consultancy at Wipro Technologies, an Indian IT solutions provider.

For example, in China, says Matlack, "there are hundreds of millions of people in their middle class, and over the next few years their purchasing power will double." Although the relative wealth of the Chinese middle class may be lower than that of developed nations, "a doubling of purchasing power when you're talking about so many hundreds of millions of people is still a really big number," he says.

The survey reveals similar views from technology executives. Asked what event or trend of the coming decade will be regarded 100 years hence as the most important, China's emergence ranked second only to the emergence of the Internet (Figure 19).

Clearly, technology companies are waking up to opportunities beyond mere offshoring in China. As Maria Tagliaferro, Analog Devices' corporate communications director, explains, "Over half of our sales now come from Asia, up from just 30% five years ago. In 10 years, China alone could represent half of our sales." Accordingly, says Tagliaferro, "The customer base and the distribution channels are likely to be sources of major change."

Other interviewees also see enormous opportunities for sales in China. "As a market, it's just huge for us," says Teradata's Brobst. "Our sweet spot is scaleability," he explains. In China, "a bank will tell you it's small, and then it will have some 50 million customers; China Mobile, they have 100 million customers; China Construction Bank, again, millions and millions of customers. Everywhere we look, we see a market tailor-made to our strengths. For us, it's a high-growth area."

But there are risks as well. Clearly, China—and, for that matter, India, Brazil and other developing countries and regions—"represent an enormous opportunity," says IBM's Cawley. "There are billions and billions of people entering the workforce, and it's not just the sheer size of these markets but also the creativity and their drive and energy; it's absolutely exhilarating." But at the same time, he adds, "it's frightening as well." The growth is "mind-boggling, change is everywhere, and it remains to be seen how these markets—economically, socially, politically—will evolve. I don't believe most of us have a real clue, really appreciate the magnitude of the change that's coming."

Massive change at Vitesse

Dr Louis Tomasetta, CEO, Vitesse Semiconductor

Of course, sometimes structural change isn't voluntary but rather is dictated by the market. According to Vitesse Semiconductor CEO Dr Louis Tomasetta (PhD), markets for his company's traditional wares plummeted a hundredfold in a period of just two years. "In the fourth quarter of 2000 we shipped $160 million, of which $120 million was for long-haul telecom," he explains. But in the same period of 2004 the figure dropped to "only $4 million." Demand for Vitesse's ultra-high-speed chips slumped as manufacturers overbuilt capacity for the next 10 years.

According to Tomasetta, this "is a lot more than a cyclical downturn. December 2004 was a meteor striking the surface." In its aftermath, says Tomasetta, everything is changing. "We've gone from being giants to becoming a small, we hope nimble, mammal." Moreover, he explains, "today the customers are different, the selling processes are different, the competition is different."

Survival today, says Tomasetta, means "looking closely at the markets, the customers and the existing players to identify areas where there are price points where we can compete—where we can reduce the value of incumbency." The company's former focus was building chips for ultra-high-speed optical communications. Today the focus is still on delivering speed in segments that are growing faster than the market as a whole, such as small computer systems interface (SCSI) connections.

Overall, says Tomasetta, "We've undergone massive change—a massive, post-NASDAQ crash makeover. We're more flexible and more focused on the needs of fast-growing customer niches. We've undergone massive change and now we're in a good position to reap the benefits."

PwC connections

Manage risk

The survey, the interviews and our analysis all paint a pattern of conclusions indicating that change surrounds us on every front. So is it reasonable to believe that very large organisations can capably and consistently institutionalise change? What can you do to enable your organisation to identify, drive and respond to change? In a nutshell, learn the delicate yet vigorous balance between opportunity and risk. Only then can the company deftly embrace change for the better.

Business risk wrought by change appears in a bewildering variety of guises—credit risk, financial risk, geopolitical risk, operational risk and reputational risk, to name just a few. Of course, you can adjust for risks through a variety of conventional mechanisms
and strategies, but still there are no certainties. In fact, many risk management strategies often spawn new, unintended risks of their own.

Risk management has come of age in recent years. It is now viewed as an integral component of how organisations are governed and how they comply with the rules and laws of the sectors and territories they do business in. Embedding risk management in business-as-usual operations is by far the hardest element of achieving enterprise-wide risk management, but getting it right delivers the most benefits.

The most effective approaches continually assess operations and controls across the whole of an organisation, including day-to-day functions, management, governance, IT and how the business is tracking against its objectives and strategies. Moreover, they transform decision making from an environment of best guesses to a state of consciously and actively accepting and managing specific levels of clearly defined risks. Enterprise-wide approaches are, in fact, even more essential in an environment of constant change.

For more information on how we help technology clients balance risk and opportunity to build shareholder value, go to www.pwc.com.

Questions for further reflection

What specific steps are you taking to ensure your organisation recognises the importance of identifying, driving and/or rapidly responding to change? What are you doing to create a culture of trend identification, creativity, response and resilience?

What is your human resources strategy? Are you attracting or developing the right skills? Are your retention efforts satisfactory? Are you providing an attractive vision and career path?

Do you view China and India as a source of inexpensive labour or as a source of consumers or both? How quickly will these two countries become technology leaders? Are you confident that your organisation appreciates both the opportunities and risks presented by the profound changes occurring in Asia?

Conclusion

Change or die.

Is it luck or capabilities in managing change that will play the largest role in defining outcomes for the high-technology industries in the decade to come? Though a little of the former is always welcome, unquestionably, leading companies in the technology industries say they are hard at work improving their chances by institutionalising change.

But is the confidence expressed by the industry well-founded? Is your own organisation poised to profit from its ability to manage change? Regardless of the answers, the fact remains that change is a defining characteristic of today's technology markets. In closing, consider the views of Wipro Technologies' Matlack:

Markets are very rewarding of innovators over time and are very punishing of those who do the same things over and over. In almost any industry, the ones that survive in the long term are those who are assessing 'what if?' and how they might have to retool and revamp their enterprise if conditions change, even at the height of their success. It may fly in the face of conventional wisdom. But when you are successful and become blind to other ways of thinking, that's when you're at your most vulnerable. To survive, you must change.

Appendix

The survey: Embracing change in the technology industries

Survey methodology

The analysis of change in the technology industries presented in this report is based upon the results of a survey conducted in May 2005 by the Economist Intelligence Unit.

Sample size

Approximately 500 specifically designed questionnaires, containing 20 questions relating to change and change management, were sent by e-mail to executives based on geographic location, industry and company size.

From that total, 126 responses were collected: 37 from Asia, 33 from North America, 38 from Western Europe, 11 from Eastern Europe, 5 from the Middle East and Africa and 2 from Latin America.

Analysis

On a number of questions, respondents were asked to respond on a scale of 1 to 5, with 1 being 'strongly agree' and 5 being 'strongly disagree' or 1 being 'very important' and 5 being 'unimportant'. In the report, some analyses state percentages that are totals of two categories of the scale—the percent of respondents choosing categories 1 and 2 or the percent of respondents choosing categories 4 and 5. Although based on actual percentages, these analyses thus convey broad agreement or disagreement.

Industry sectors

The survey results come from across the technology industries: 46% from IT services, 16% from software, 11% from IT hardware, 11% from other sectors, 8% from telecoms equipment manufacturers, 4% from biotechnology companies and 4% from semiconductors.

Seniority of respondents

A good cross-section of executives responded to the survey, including 21% and 32% of responses coming from CEOs and managers, respectively, as well as 11% from chief technical officers, chief information officers or chief knowledge officers, and a further 5% from chief financial officers.

Company metrics

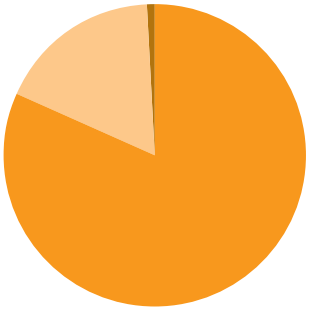
Half of the responses were received from companies that have global revenues of $500 million or less and that employ 500 people or fewer worldwide. The next highest response rate was received from companies with global revenues of $10 billion or more, and from those companies that count more than 100,000 employees in their global work force.

Results of the survey

Respondents' answers to the survey questions are illustrated in the following figures. As a result of the rounding of survey numbers, the totals in some figures do not add up to exactly 100%.

1

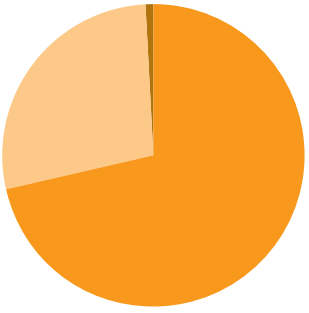
How would you describe the degree of change in business conditions experienced by your company over the past 10 years?



- 81.7% Profound change
- 17.5% Moderate change
- 0.8% No change

2

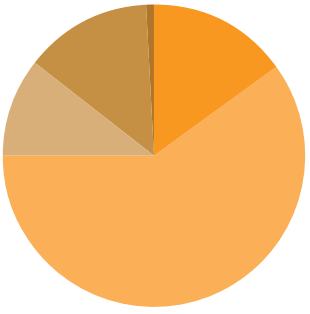
What degree of change do you anticipate over the next 10 years?



- 71.4% Profound change
- 27.8% Moderate change
- 0.8% No change

3

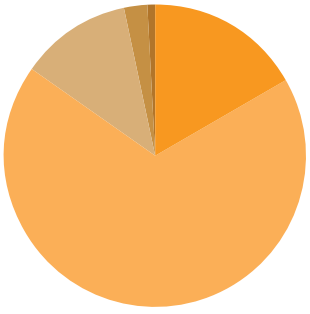
How capably has your company dealt with the business changes of the past 10 years?



- 15.2% Highly effectively
- 60.0% Somewhat effectively
- 10.4% Neither effectively nor ineffectively
- 13.6% Somewhat ineffectively
- 0.8% Highly ineffectively

4

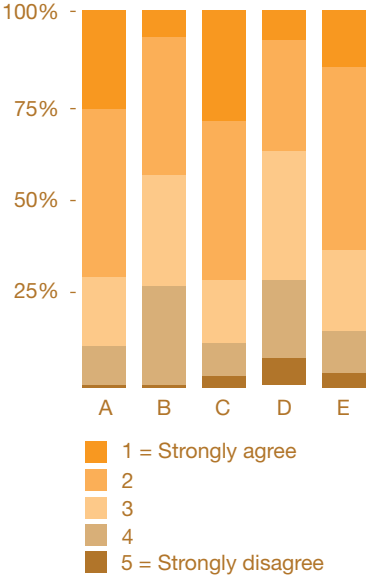
How capable do you believe your company will be in managing change over the next 10 years?



- 16.7% Highly effectively
- 68.3% Somewhat effectively
- 11.9% Neither effectively nor ineffectively
- 2.4% Somewhat ineffectively
- 0.8% Highly ineffectively

5

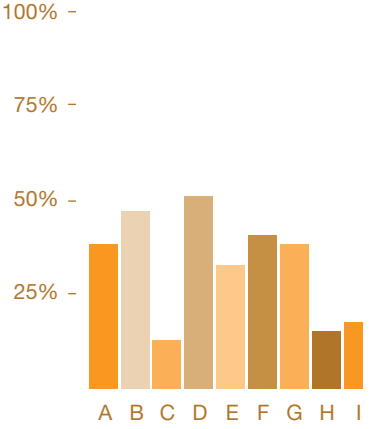
To what extent do you agree or disagree with the following statements regarding your company's attitudes, approaches and capabilities relating to change?



A Our company views change more as an opportunity than as a risk.
B Our workforce not only understands change, but embraces change.
C The ability to continuously manage change and its associated risks and rewards is a fundamental component of our competitive advantage.
D Our company has a comprehensive and disciplined approach enabling it to detect, understand, measure and dynamically/capably respond to change.
E We build flexibility into our partnerships, staffing and manufacturing arrangements, in order to better manage change.

6

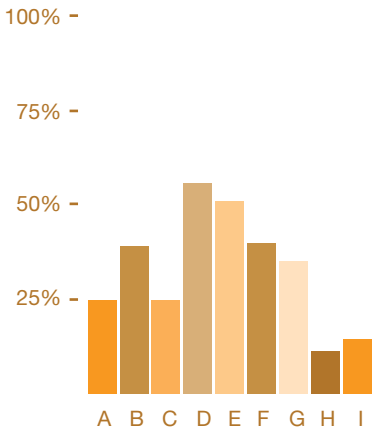
Which of the following have been vital in helping your company manage change over the past 10 years? Select three choices.



A Flexible sourcing/manufacturing
B Collaborative partnerships with other technology companies
C Collaborative partnerships with companies from other industries
D Collaboration with end-users and customers
E Flexible, change-conscious workforce
F Close customer relationships
G Flexible, scaleable IT
H Flexible balance sheet/cash flow
I Commitment to open standards

7

Which of the following do you expect will be vital in helping your company manage change over the next 10 years? Select three choices.



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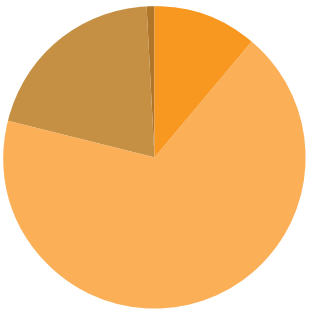
D Collaboration with end-users and customers
E Flexible, change-conscious workforce
F Close customer relationships
G Flexible, scaleable IT
H Flexible balance sheet/ cash flow
I Commitment to open standards

8

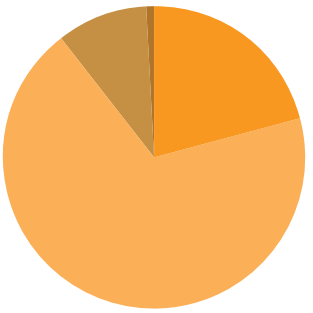
How would you describe the state of your company's strategies, processes, culture and other business model elements in terms of their ability to navigate change?



- 11.3% Highly adaptable
- 67.7% Fairly adaptable
- 20.2% Fairly rigid
- 0.8% Rigid

9

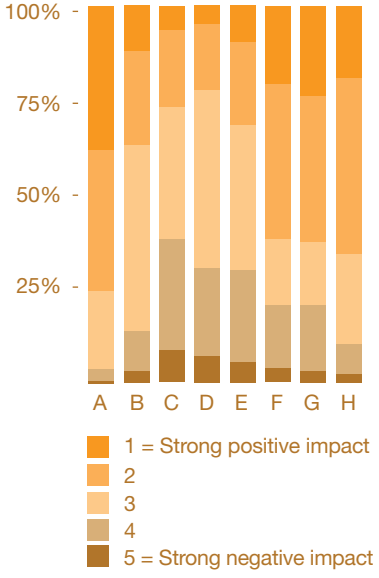
How well do you think your company's business model will adapt to change over the next 10 years?



- 21.0% Highly adaptable
- 68.5% Fairly adaptable
- 9.7% Fairly rigid
- 0.8% Rigid

10

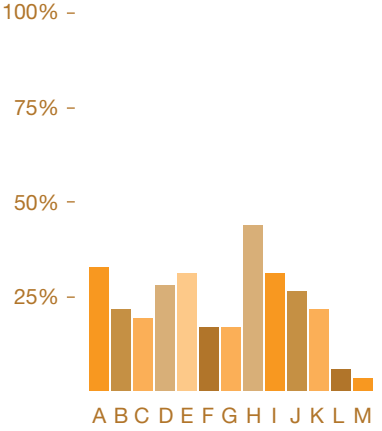
In the coming decade, what will be the direction and magnitude of the impact of the following trends/realities on your company?



A Convergence in digital services
B Convergence in biology/ engineering
C Cyberterrorism
D The war on terrorism
E Rising energy prices
F China's economic emergence
G India's economic emergence
H The EU's economic expansion

11

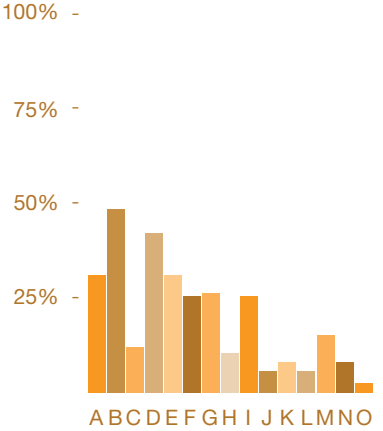
Over the next 10 years, what will be the greatest risks faced by your segment of the high-tech industry? Select three choices.



A Government regulation
B Outdated legal frameworks
C Lack of global industry standards
D Lack of safeguards for intellectual property
E Uncertain global economic conditions
F Uncertain national economic conditions
G Competition from other industries
H Competition for talent/ expertise
I Failure to identify/anticipate changing customer needs
J Failure to capitalise on opportunities
K Failure to respond to changing customer needs
L Failure to raise funding from the markets or other lenders
M Other

12

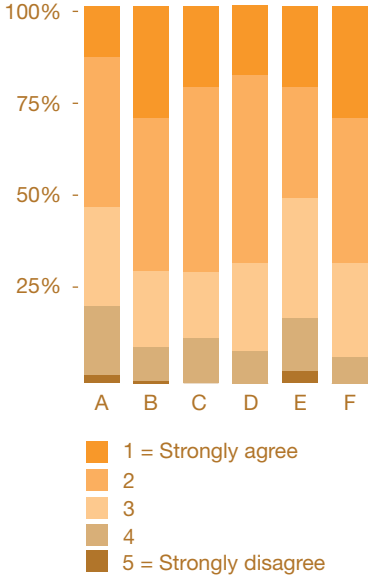
Over the next 10 years, what do you think will be the greatest risks faced by your own company? Select three choices.



A Competition from new entrants, small or start-up companies
B Competition from established companies
C Competition from other industries
D Competition for talent/ expertise
E Failure to capitalise on opportunities
F Failure to identify/anticipate changing customer needs
G Failure to respond to changing customer needs
H Failure to raise funding from the markets or other lenders
I Government regulation
J Outdated legal frameworks
K Lack of global industry standards
L Lack of safeguards for intellectual property
M Uncertain global economic conditions
N Uncertain national economic conditions
O Other

13

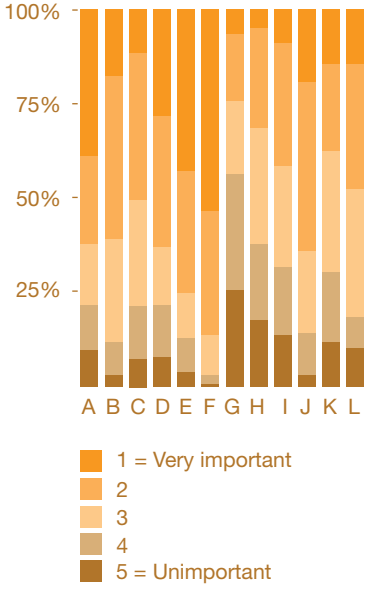
To what extent do you agree with the following statements regarding the coming decade?



A Small or start-up technology competitors with new products and/or business models will present a greater strategic challenge than established technology competitors.
B Small or start-up technology competitors are more likely than larger, established companies to create breakthrough products or business models.
C Relative to smaller organisations, large technology-focused companies will have greater resources, scale and breadth of capability to exploit convergence.
D As digital, biomechanical and other convergence scenarios advance, cross-industry competition will intensify.
E The emergence of revolutionary business models (such as Dell, Amazon) will pose significantly greater competitive threat than industry consolidation.
F The technology sector will become one of the principal drivers of wealth creation.

14

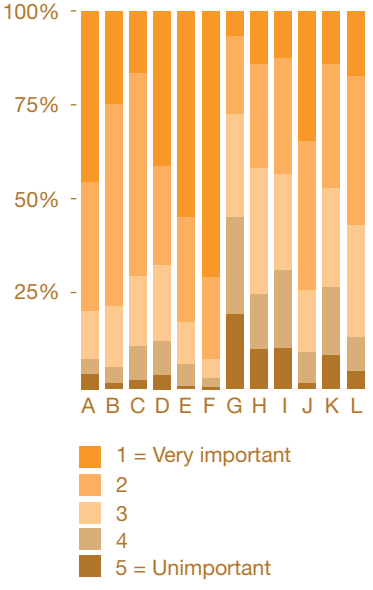
In the past 10 years, how important were the following mechanisms in enabling your company to navigate and profit from change?



A Strategic acquisitions/ partnerships
B Internal training
C Performance evaluation/ reward frameworks
D R&D
E CEO leadership
F Customer relationships/ interaction
G Political lobbying
H Open systems
I Supply-chain initiatives
J Employee recruitment/ retention
K Participation in setting standards
L Vertical industry specialisation

15

Over the next 10 years, how important will the following mechanisms be in terms of enabling your company to navigate and profit from change?



A Strategic acquisitions/ partnerships
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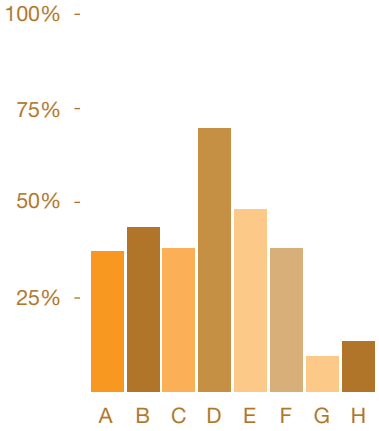
D R&D
E CEO leadership
F Customer relationships/ interaction
G Political lobbying
H Open systems
I Supply-chain initiatives
J Employee recruitment/ retention
K Participation in setting standards
L Vertical industry specialisation

16

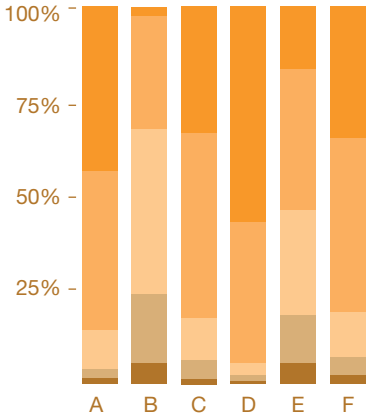
Which of the following individual behaviours/ attributes will be most vital to your organisation in the coming decade? Select three choices.



A Initiative/empowerment
B Teamwork
C Technical knowledge/ capability
D Customer focus
E Innovation/creativity
F Adaptability
G Accountability
H Ethical behaviour

17

How important are the following capabilities for managing change?

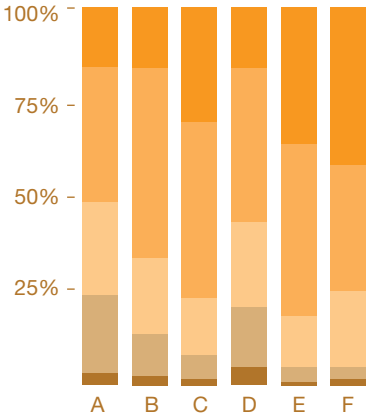


1 = Very important
2
3
4
5 = Unimportant

A Building alliances with appropriate partners
B Building alliances with competitors
C Balancing initiative and innovation with teamwork, focus and control
D Collaborating with customers to identify new opportunities
E Collaborating with industry groups to establish effective standards
F Training employees to manage change

18

To what extent do you agree with the following statements regarding the coming decade?

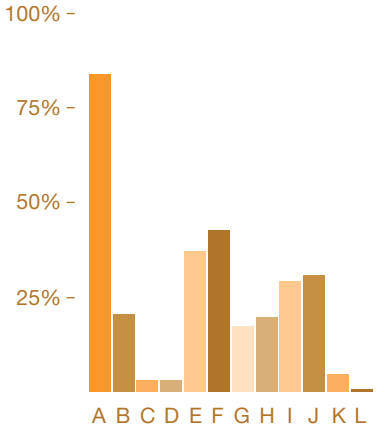


1 = Strongly agree
2
3
4
5 = Strongly disagree

A Government regulators will tend to inhibit technology development, adoption and usage.
B As multiple disciplines collide through the process of convergence, industry groups and end-users need to more aggressively collaborate to develop common lexicon and standards.
C Today's laws and regulations are not sufficiently internationalised or up to date to govern converging technologies.
D The reliability of Moore's Law (for example, computer processing power will continue to double every 18 months) will survive another decade.
E The greatest challenge for the technology industry is learning to more effectively collaborate with customers.
F In the past we organised around technologies; in the future we will organise around customers.

19

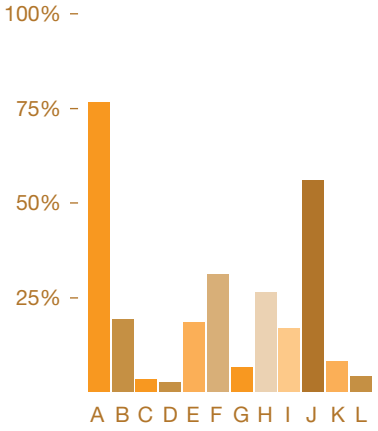
Which of the following would you describe as the most important change "events" of the past decade? Select three choices.



A The growth of the Internet
B The growth of e-commerce
C The emergence of reality television
D The success of Amazon.com
E The exponential rise in the processing power of computer chips
F The rise of information-driven consumer power
G Corporate scandals/ Sarbanes-Oxley
H September 11th and the war on terrorism
I The proliferation of cell phones/PDAs
J The rise of China
K The arrival of the euro
L Other

20

One hundred years from now, what do you think will be remembered as the biggest change event?



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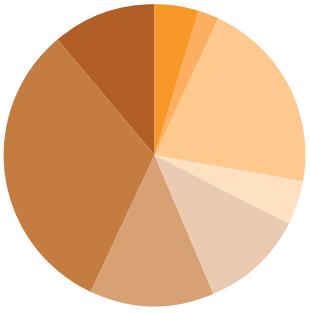
F The rise of information-driven consumer power
G Corporate scandals/ Sarbanes-Oxley
H September 11th and the war on terrorism
I The proliferation of cell phones/PDAs
J The rise of China
K The arrival of the euro
L Other

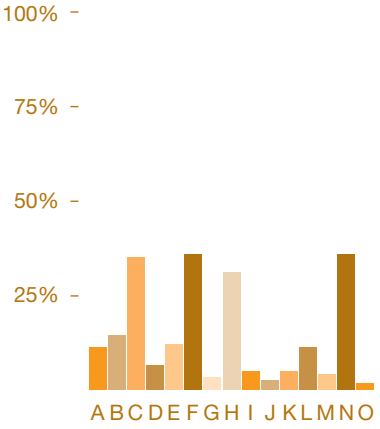
Profile of the survey respondents

Which of the following best describes your title?



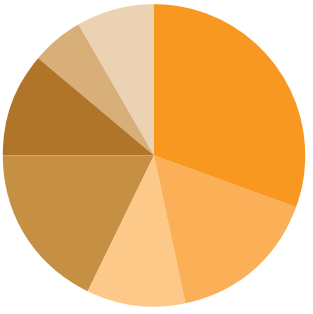
- 4.8% Board member
- 2.4% Chairman
- 20.6% CEO/COO/President/ Managing Director
- 4.8% CFO/treasurer/ comptroller
- 11.1% CIO/CTO/chief knowledge officer
- 13.5% SVP/Senior executive/VP
- 31.7% Manager
- 11.1% Other

What are your main functional roles? Choose no more than three functions.



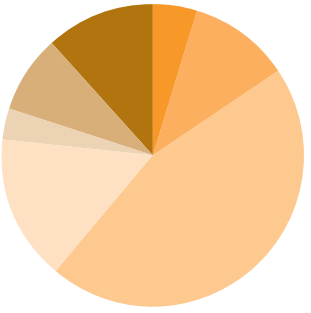
- A Customer service
- B Finance
- C General management
- D Human resources
- E Information and research
- F IT
- G Legal
- H Marketing and sales
- I Operations and production
- J Procurement
- K Risk
- L R&D
- M Supply-chain management
- N Strategy and business development
- O Other

What is the maximum amount of company spending (in US dollars) you are authorised to sign for?



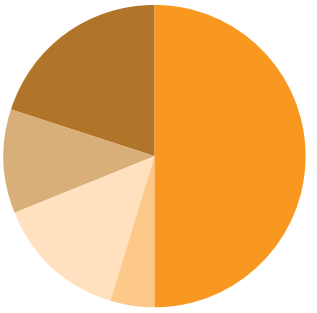
- 30.6% Less than $20,000
- 16.1% $20,000 to $50,000
- 10.5% $50,000 to $100,000
- 17.7% $100,000 to $500,000
- 11.3% $500,000 to $2m
- 5.6% $2m to $10m
- 8.1% More than $10m

What is your primary industry?



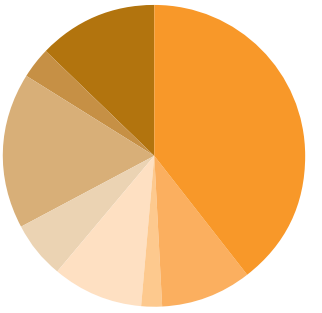
10.7%	IT hardware
5.0%	Biotechnology
45.5%	IT services
15.7%	Software
3.3%	Semiconductors
8.3%	Telecoms equipment
11.6%	Other

What are your organisation's global annual revenues in US dollars?



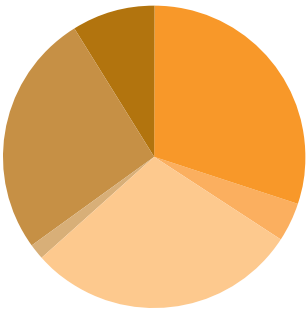
50.0%	$500m or less
4.8%	$500m to $1bn
14.3%	$1bn to $5bn
11.1%	$5bn to $10bn
19.8%	$10bn or more

What is the total number of employees at your company worldwide?



39.7%	Fewer than 500
9.5%	500 to 2,000
2.4%	2,000 to 5,000
9.5%	5,000 to 10,000
6.3%	10,000 to 25,000
16.7%	25,000 to 50,000
3.2%	50,000 to 100,000
12.7%	More than 100,000

In which region are you personally based?



30.2%	Western Europe
4.0%	Middle East & Africa
29.4%	Asia-Pacific
1.6%	Latin America
26.2%	North America
8.7%	Eastern Europe

Acknowledgments

PwC prides itself on the concept of Connected Thinking. For this study we drew support and expertise from PwC staff with varied experience and knowledge from around our firm. A core group of PwC staff worked diligently to help produce this publication. These team members include:

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Of further interest

Additional change management thought leadership from PricewaterhouseCoopers includes:

10 minutes on driving change
A four-page article on business agility.

How consumer conversation will transform business
Examines how new technologies and new methodologies—blogs, message boards, phone calls and other interactive media—are transforming a new source of consumer data into a dramatically deeper understanding of consumers.

How to build an agile foundation for change
An in-depth look at why agility is so important today and what kinds of challenges companies face in planning for change.

View, Winter '08
With the following articles: "Change agents: Designing agility into your corporate DNA" and "Your view on constant change" from PwC's Global CEO survey.

The above publications can be found at www.pwc.com on the publications page.

Additional Technology Executive Connections reports:

Going green: Sustainable growth strategies
What challenges and opportunities does the growing demand for green products and operations represent for technology companies?

Exploiting intellectual property in a complex world
A look at the shift in attitude from IP as legal issue/concern to IP as strategic asset that must be managed and maximised

Successful strategies for talent management
How technology companies are responding to the increasing scarcity of the right talent

Shaping digital convergence through mergers & acquisitions
What M&A activity is telling us about the market's approach to convergence

To download or order a hard copy any of the above reports please visit www.pwc.com/techconnect.

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PricewaterhouseCoopers delivers value with a global perspective through local implementation. Please contact the technology industry leader nearest you to discuss the challenges facing your company and how we can help you.

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