Economist Intelligence Unit

The Economist

Foresight 2020

Economic, industry and corporate trends

A report from the Economist Intelligence Unit
sponsored by Cisco Systems

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Preface

In an age of uncertainty, peering 15 years into the future may seem like hubris. But ignoring long-term trends—demographic, economic, corporate—is an even less attractive option. Understanding the long-term future is vital in ensuring that strategies are sustainable, that opportunities are identified at an early stage and that challenges are addressed before they become insurmountable.

This report assesses likely changes to the global economy, to eight major industries and to corporate structures between now and 2020. Our research drew on three main initiatives:

- The Economist Intelligence Unit's proprietary long-term economic forecasts for the world's major economies.
- A wide-ranging online survey of senior executives from around the world in November-December 2005. In total, 1,656 executives took part.
- A series of in-depth interviews with executives, analysts and policymakers around the world.

We would like to thank all the executives who participated in the survey and interviews for their time and insights.

Cisco Systems sponsored the report. We are grateful to the Cisco team, and to Kenton Lewis, Douglas Frosst, David Chalmers and Kathy Burrows in particular, for their support during the research process.

Andrew Palmer was the editor of the report. Laza Kekic wrote the chapter on the world economy. Graeme Maxton, David Jacoby, Graham Richardson, Aviva Freudmann, Paul Kielstra, Ray Smyth, Bill Millar and Joanne Taaffe wrote the industry sections. Tom Standage contributed to the chapter on the company of the future.

The Economist Intelligence Unit bears sole responsibility for the content of this report. The Economist Intelligence Unit's editorial team executed the online survey, conducted the interviews and wrote the report. The findings and views expressed in this report do not necessarily reflect the views of the sponsor.

March 2006

Executive summary

A lot can happen in 15 years. At the start of the 1990s, China was largely a planned economy, and the Soviet Union still existed. Few people had heard of the Internet and e-mail seemed closer to science fiction than reality.

The next 15 years will bring further massive changes to the shape of the world economy, to the landscape of major industries and to the workings of the company. The major findings of the Foresight 2020 survey are summarised overleaf, but the principal trends identified in this report include the following:

1 Globalisation. It's too early to talk of Asia's century, but there will be a redistribution of economic power. Emerging markets, and China and India in particular, will take a greater slice of the world economy. Non-OECD markets will account for a higher share of revenue growth between now and 2020 than OECD economies. Labour-intensive production processes will continue to shift to lower-cost economies, which will still enjoy a massive wage advantage over developed markets. The pace of globalisation will be arguably the critical determinant of the rate of world economic growth.

2 Demographics. Population shifts will have a significant impact on economies, companies and customers. The favourable demographic profile of the US will help to spur growth; ageing populations in Europe will inhibit it. Industries will target more products and services at ageing populations, from investment advice to low-cost, functional cars. Workforces in more mature markets will become older and more female.

3 Atomisation. Globalisation and networking technologies will enable firms to use the world as their supply base for talent and materials. Processes, firms, customers and supply chains will fragment as companies expand overseas, as work flows to where it is best done and as information digitises. As a result, effective collaboration will become more important. The boundaries between different functions, organisations and even industries will blur. Data formats and technologies will standardise.

4 Personalisation. Price and quality will matter as much as ever, but customers in developed and developing markets will place more emphasis on personalisation. Products and services will be customisable, leading firms to design products in a modular fashion and, in the case of manufacturers, assemble them in response to specific customer orders. Customers and suppliers will be treated in different ways, depending on their personal preferences and their importance to the business.

5 Knowledge management. Running an efficient organisation is no easy task but it is unlikely on its own to offer lasting competitive advantage. Products are too easily commoditised; automation of simple processes is increasingly widespread. Instead, the focus of management attention will be on the areas of the business, from innovation to customer service, where personal chemistry or creative insight matter more than rules and processes. Improving the productivity of knowledge workers through technology, training and organisational change will be the major boardroom challenge of the next 15 years.

The Foresight 2020 survey: The softer side of success

As part of the research for this report, the Economist Intelligence Unit surveyed more than 1,650 executives around the world for their views on how their companies, and the environment in which they operate, would change over the next 15 years.

Executives expect the fundamentals to matter as much as ever. A clear strategy, top-notch management and high-quality products and services are seen as critical sources of competitive advantage now and in the future. But respondents also expect much to change.

Low costs will matter less as a source of differentiation. Make no mistake: cost control will be crucial. Pricing pressures and low-cost competition count as two of the three most significant risks that companies will face between now and 2020 (alongside poor management decisions). But two-thirds of respondents do not believe that having a low cost base will be a source of greater competitive advantage in that time-frame. What's more, the value of price competitiveness to customers is expected to decline relative to other factors, such as personalisation of products and quality of customer service.

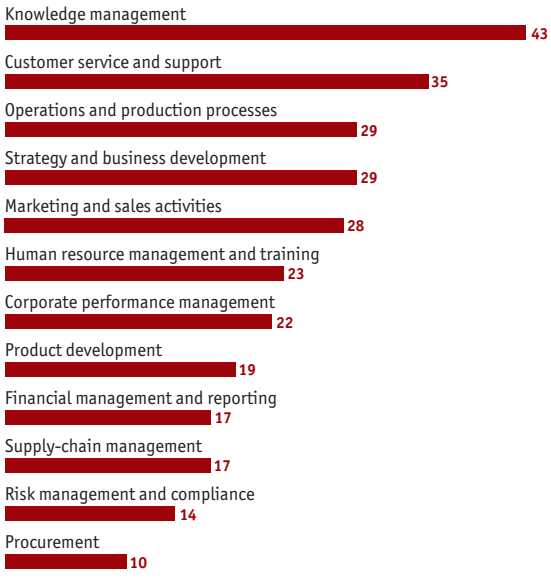
The human touch will become more central to competitive advantage. A large majority of executives expect simpler tasks, such as airline check-in procedures or processing expense claims, increasingly to be handled by machines. As production processes and these routine transactions become ever more commoditised and automated, value will lie in hard-to-replicate personal relationships between employees, customers and suppliers. The vast majority of executives think that knowledge workers will be their most valuable source of competitive advantage (compared with other roles) in 2020, whether in outward-facing functions such as sales or inward-facing ones such as knowledge management.

Collaborative relationships will multiply and intensify. A majority of executives believe that high-quality relationships with outside parties will become more important as a source of competitive advantage between now and 2020. Collaborative problem-solving is expected to increase in volume inside and outside the organisation, as customers and suppliers become more involved in product development, as cross-functional and crossborder teams work together more frequently and as partnerships with other organisations proliferate.

Productive knowledge

Getting these high-value interactions right will be a major challenge. A lack of people with the requisite interpersonal skills is seen as the biggest single barrier to improved collaboration with outside parties, closely followed by cultural hostility to more open relationships, data security worries and an absence of incentives to form and develop such relationships. Executives believe that employees' ability to communicate, to solve problems and to lead will be

Which of the following areas of activity offer the greatest potential for productivity gains over the next 15 years?
Select up to three activities.
(% respondents)



Source: Economist Intelligence Unit survey, 2005.

more important to their organisations' future success than functional and technical capabilities.

Initiatives to improve the quality of the workforce in these areas will include recruitment, training and redeployment: a large majority of executives expect the proportion of employees in complex knowledge-based roles to increase over the next 15 years. But simply employing more knowledge workers, who tend to command higher salaries, can quickly become a short cut to lower margins—unless they also become more productive.

Executives clearly believe there are gains to be made in this regard. There are striking overlaps between the areas in which complex interpersonal relationships are thought to matter most—customer support, business development, corporate performance management, marketing and sales and knowledge management—and those thought to have the greatest scope for productivity growth.

Although increased automation of processes remains a prominent focus for productivity growth, particularly in non-services industries, the scope for driving greater efficiencies out of production processes and simple transactions is diminishing. Instead, respondents expect to focus more energy on improving organisational structures and communication as sources of enhanced productivity.

- **Technology spending will shift to enabling knowledge workers to do their job better**. Asked how their organisations will improve their performance in knowledge-based roles, use of information technology (IT) was identified as the single most likely approach. A major shift in IT investment is anticipated over the next 15 years. Today, such investment is focused mainly on general IT infrastructure and on financial management and reporting. By 2020, executives expect the emphasis on infrastructure spending to have fallen away dramatically and for knowledge management and customer service to be the principal areas of IT focus.

- **Organisational structures will change**. In order to increase the efficiency of interactions with others, executives expect organisations to become flatter and for employees to have more autonomy to make substantive decisions. More than two-thirds of respondents also say that they will incentivise employees to collaborate more effectively with other parties.

Differences between industries and market segments should not be papered over, of course. Manufacturers are far likelier than service industries to look to increased automation of processes as a route to higher productivity. Low costs will be critical for companies operating in discount segments. And some industries, such as retailers, are already more sophisticated in their relationship management than others.

But the survey points to two broad trends that will affect companies across sectors. First, competitive advantage will increasingly depend not on routine, easy-to-automate processes but on unpredictable, hard-to-automate knowledge workers. Second, companies will shift their IT spending, human resources (HR) strategies and organisational structures to make these workers more productive. Managing both these trends—in essence, marrying soft skills with hard targets—will be the defining boardroom challenge of the coming years.

Who took the survey?

1,656 executives from 100 countries around the world participated in the Foresight 2020 survey, which was conducted in late 2005. Respondents were spread evenly between the three main centres of economic activity—30% from Asia-Pacific, 34% from western and eastern Europe and 27% from North America.

As well as being highly cosmopolitan, the survey group was very senior. Almost one-third of respondents were CEOs, and half of the sample were C-level executives or board members.

Participants were drawn from a wide range of industries and business segments, as well as from a spread of company sizes, with more than one-third reporting annual revenue of over US$1bn.

Chapter 1 The world economy

Foresight 2020: The world economy at a glance

The world economy will be two-thirds bigger in 2020 than in 2005. Global GDP will grow at an average annual rate of 3.5% in 2006-20 (similar to the past 25 years). The US will outpace other major developed economies, with growth of almost 3% a year, compared with 2.1% for the EU25 and less than 1% for Japan, whose population will be shrinking.

The share of the EU and the US in world income will stay about the same in 2020 as it was in 2005. The US will maintain one of the fastest growth rates in the industrialised world, thanks in part to a favourable demographic profile. The EU will make up for slower growth through territorial expansion, growing to a club of more than 30 countries.

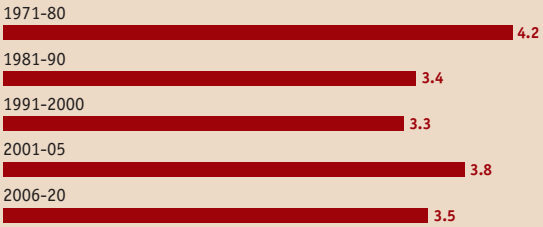
Propelled by fast growth in China and India, Asia will increase its slice of world GDP from 35% in 2005 to 43% in 2020. But it is too soon to talk of Asia's century. On a per-capita basis, China and India will remain far poorer than Western markets and the region faces a host of downside risks. Asia will narrow the gap in wealth, power and influence, but will not close it.

The US will remain the most important single country across all the dimensions of power as result of the size of its GDP, its military might, internal cohesion and persistent technological lead. The US dollar will remain the key international reserve currency. Europe will lack the cohesion to achieve superpower status. The transatlantic economic relationship will remain the most important globally, even if its relative importance—in terms of trade, investment and share of global GDP—falls as Asia's rises.

The pace and extent of globalisation will be the single most important determinant of world economic growth. Our baseline scenario is for gradual trade and investment liberalisation, but if protectionism were to take greater hold, the consequences for world growth would be substantial and adverse. The prospects for faster liberalisation are constrained by the fact that the US now stands to benefit less than others from increased globalisation.

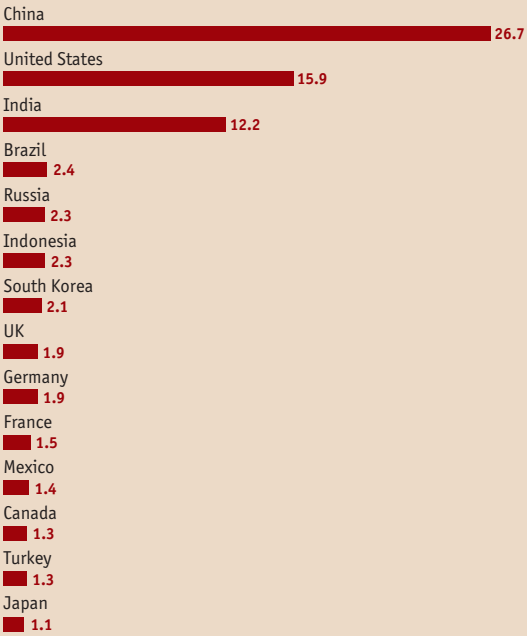
Key economic data

Global real GDP growth
(annual average, %)



Source: IMF and Economist Intelligence Unit for 1970-2005; Economist Intelligence Unit forecasts for 2006-20.

Contribution to global growth
(2006-20, %)



Increase in a country's real GDP, at constant 2005 PPP, as a share of increase in global GDP over the same period.

Source: Economist Intelligence Unit.

The world economy will be two-thirds bigger in 2020 than in 2005. Global GDP will grow at an average annual rate of 3.5% in 2006-20 (similar to the past 25 years). The US will outpace other major developed economies, with growth of almost 3% a year, compared with 2.1% for the EU25 and less than 1% for Japan, whose population will be shrinking. The world's two most populous states, China and India, will be among the fastest-growing economies. But both China and India will remain poor countries. China's GDP per head will in 2020 roughly equal the average income in today's Poland.

Other emerging markets, although outpacing the developed world, will underperform—relative to their potential and compared with fast-growing Asia, whose share of global GDP will rise from 35% in 2005 to 43% in 2020. Russia, Brazil and Mexico will grow at a hardly thrilling 3% a year; the Middle East and North Africa at 4%; and Sub-Saharan Africa's growth of under 3% a year will be especially disappointing, held back in part by the impact of the AIDS epidemic. In Latin America, growth in GDP per head will merely be sufficient to prevent the current gulf with the developed world from widening. Sub-Saharan Africa will fall further behind.

World consumer spending, measured in US dollars at market exchange rates, will expand at an annual average rate of 5.6%—to some US$62trn in 2020, compared with US$27trn today. In terms of US dollar spending power, the US will remain by far the biggest consumer market in the world, with roughly one-third of the global pie. But much of the increase in consumer spending will occur in the leading emerging markets. China is set to become the world's second-biggest consumer market, and India will be rivalling the bigger European markets by 2020.

These shifts look starker when the world's economies are measured not at market exchange rates but at purchasing power parity/PPP (see box): on that basis, China will have closed the gap in economic size with the US by 2020. By then it will easily have the largest technology sector in the world. It will displace Germany as the main country of origin for international tourists early in the next decade. And by 2020 China will almost certainly have a larger fleet of passenger cars than the US.

Yet even in 2020 it will be too soon to talk of an "Asian century". The US and EU shares in world income in 2020 will be about the same as they are now—just under 20% each at PPP weights. True, the share of China and India in global GDP will increase and in China's case will in 2020 be roughly equal to that of the US and of the EU. But a chunk of that gain will come at the expense of another Asian country, Japan.

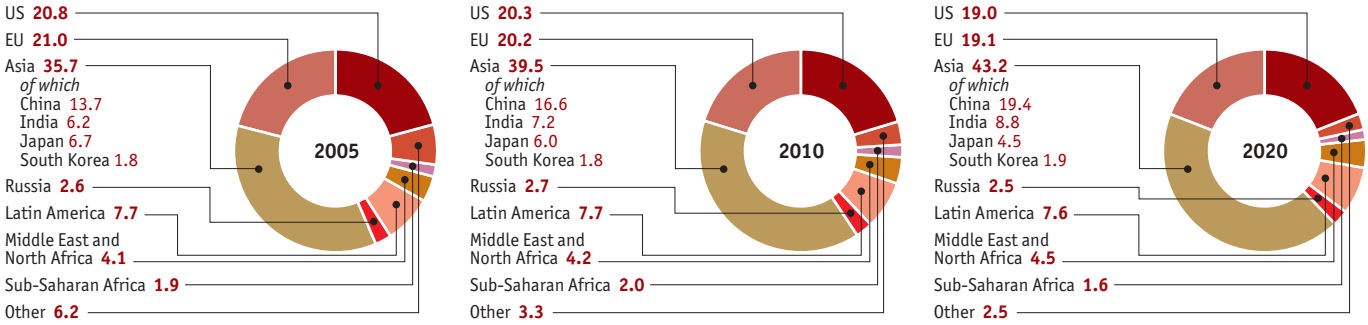
The EU will make up for slower growth through territorial expansion. The EU will by 2020 encompass all the Balkan countries and Turkey. Bulgaria and Romania are set to join in 2007 or 2008, and Croatia about two years later. By 2020 the rest of the western Balkans (Albania, Bosnia and Hercegovina, Macedonia and Serbia and Montenegro) and Turkey will be members. Today's EU of 25 will by 2020 have become a Union of more than 30 countries.

The US will produce the same economic output as the EU with a much smaller population. The average income gap widens with each enlargement, as the EU absorbs ever poorer new members. Average GDP per head of the EU15 was 70% of the US level in 2000. This fell to 65% for the EU25 in 2005, mainly because of the 2004 enlargement that took in much poorer states than the EU15, but also because of the EU's weaker

What is purchasing power parity?

Comparisons at market exchange rates systematically overestimate the incomes of rich relative to poor countries because non-tradeable services are much cheaper in poor countries. Also, exchange rates fluctuate for reasons that have little to do with the purchasing power of a currency. Purchasing power parity (PPP) weights are conversion factors that eliminate the difference in price levels between countries. GDP at PPP thus measures the volume of goods and services produced at a common set of prices.

Share in world GDP (at PPP)
(%)



Note. The EU is expected to have 28 states in 2010 and 33 in 2020.
Source: Economist Intelligence Unit.

performance in the first half of the decade. The average income of the EU33 will be only 56% of the US average in 2020.

In 2020 the US will remain the world's largest trading nation, although its share of world exports and imports of goods and services will slip slightly, from 14% in 2005 to 12%. China will displace Germany in second place and by 2020 will not be far behind the US. India will record the biggest jump in world rank—from 24th to 10th—but will still account for only 3% of world trade in 2020.

These are some of the headline forecasts in our "baseline" scenario. But alternative futures are of course possible. Crucially, the continued globalisation that we envisage in our baseline scenario could fail to happen. Global economic development over the next 15 years is unlikely to take the form of a smooth upward trajectory. At the end of this chapter we look at a range of alternative scenarios.

American exceptionalism

The long-term GDP growth potential of the US will be close to 3% a year. This will be one of the highest growth rates in the industrialised world, comparing favourably with the 2% estimated for the developed EU and less than 1% for Japan. It is slightly slower than the 3.3% the US achieved during the 1980s and 1990s, but still very respectable for a developed economy. This is particularly true given that the US is the world's technological leader and hence has little opportunity for growth by importing technological know-how.

US growth will be driven principally by productivity growth, itself largely a function of the country's investment in and use of information and communications technology (ICT). Previous research by the Economist Intelligence Unit has shown that ICT is the main factor behind the transatlantic productivity gap, accounting for about 80% of the 0.52-percentage-point difference between GDP per head growth rates in the US and the euro zone big three (Germany, France, Italy) since 1995.[1] The US is forecast to maintain its lead in the use and application of ICT over the next 15 years (see box on page 18).

Growth will also be driven by labour force expansion. Almost alone among developed nations, the population of the US will continue to grow at a relatively high rate—a phenomenon that has been dubbed American "demographic exceptionalism". Over the next 15 years high immigration and fertility rates in the US will fuel continued working-age population growth. By contrast, in the EU, even after allowing for immigration, the growth in the population of working age is expected to slow and turn negative over the next 15 years. The annual average rate of growth in

1. *Reaping the benefits of ICT*, Economist Intelligence Unit, 2004.

Real GDP growth, selected countries
(annual average, %)

	GDP			GDP per head		
	2006-10	2011-20	2006-20	2006-10	2011-20	2006-20
World	4.0	3.3	3.5	2.7	2.4	2.5
EU25	2.2	2.0	2.1	2.0	2.0	2.0
EU15	2.0	2.0	2.0	1.7	1.9	1.8
Asia	5.5	4.5	4.9	4.5	3.6	3.9
Latin America	3.6	3.0	3.2	2.4	2.1	2.2
Middle East & North Africa	4.4	3.8	4.0	2.7	2.4	2.5
Sub-Saharan Africa	3.5	2.5	2.8	2.0	1.2	1.4
United States	3.0	2.8	2.9	2.0	1.8	1.9
France	2.0	1.8	1.9	1.6	1.6	1.6
Germany	1.8	1.9	1.9	1.7	2.0	1.9
Italy	1.5	0.8	1.0	1.5	1.0	1.2
Turkey	4.9	4.1	4.4	3.6	3.3	3.4
United Kingdom	2.1	2.4	2.3	1.7	2.0	1.9
Czech Republic	4.1	2.4	3.0	4.2	2.6	3.1
Hungary	3.3	3.1	3.2	3.6	3.4	3.5
Poland	4.1	3.0	3.3	4.2	3.0	3.4
Romania	4.5	3.3	3.7	4.7	3.5	3.9
Russia	4.7	2.6	3.3	5.1	3.0	3.7
Slovakia	5.3	3.5	4.1	5.1	3.4	4.0
Ukraine	5.7	3.5	4.2	6.3	3.9	4.7
Japan	1.1	0.5	0.7	1.2	0.8	0.9
China	7.8	5.1	6.0	7.2	4.5	5.4
India	6.6	5.5	5.9	5.2	4.3	4.6
Indonesia	5.6	5.0	5.2	4.2	3.9	4.0
Malaysia	5.3	4.8	5.0	3.4	3.1	3.2
Pakistan	5.9	5.3	5.5	4.0	3.6	3.7
Philippines	5.2	4.7	4.9	3.4	3.1	3.2
Singapore	4.5	4.0	4.1	3.6	3.4	3.5
South Korea	4.0	3.9	4.0	3.6	3.6	3.6
Taiwan	4.5	3.4	3.8	4.2	3.0	3.4
Thailand	4.5	4.7	4.7	3.8	4.2	4.1
Vietnam	7.0	4.6	5.4	5.7	3.4	4.2
Argentina	3.8	3.4	3.6	2.7	2.7	2.7
Brazil	3.9	2.9	3.2	2.6	2.1	2.3
Colombia	3.7	2.8	3.1	2.1	1.6	1.8
Chile	5.2	4.3	4.6	4.0	3.5	3.7
Mexico	2.8	3.0	2.9	1.6	1.9	1.8

Source: Economist Intelligence Unit.

Forecasting the future

To forecast long-term economic growth, we use a model in which growth in real GDP per head is related to its key determinants. These include demographic factors; various policy variables; variables reflecting geography, location and external conditions; education levels and labour quality; historical legacies; and the scope for convergence, based on initial GDP per worker.

Many of the drivers of long-term economic growth are pre-determined or fixed (geography, historical legacies and other initial conditions) or very difficult to alter quickly (demographics and deep-seated institutional change). But initial conditions and demography are not destiny. Economic policies can have a significant impact on growth.[2]

the US working-age population in 2006-20 is projected at 0.5% per year (as the rate slows from almost 1% this decade to 0.3% in 2010-20).

Europe—could do better

The EU will in 2020 have more than 600m people, 80% more than the US. The expansion will have been achieved almost entirely on the basis of increased country membership—the population of today's EU25 will scarcely be larger in 2020 than it is now (470m versus 460m). The addition of Turkey alone will add 84m people to the EU's population in 2020, or 13.8% of the total.

The EU's enlargements will not change its deeper demographic dynamics. Indeed the demographic problems of the new east European member states (the eight that joined in 2004 and the Balkans that are to follow) are even more severe than those of the west European EU members. The "New Europe" of the east is getting older much more quickly than the "Old Europe" of the west. Whereas the working-age population of the EU15 will shrink moderately in 2010-20 (the shrinkage will accelerate only after 2020), the east European states will experience a severe decline (at an annual rate of 0.8% per year).

Those who expect the new EU members to grow very fast and catch up rapidly with the west European members will be disappointed. GDP growth in the members that joined in 2004 will be 3.5% a year in 2006-20, equal to the world average. A slightly higher average growth rate is projected for the Balkan states, and Turkey should be able to sustain annual average growth above 5%. The east European members' growth will be considerably above the 2% projected for the EU15 over the same period. But this provides for only limited catch-up. The average income per head of the joiners, at just under 50% of the EU15 average in 2004, will reach just 60% of the EU15 average in 2020.

In the big European economies, unlike in the US, labour productivity growth has decelerated since the mid-1990s. Performance should pick up. Many EU economies are undertaking labour-market and tax reforms. European companies should also benefit from the adoption of some of the best practices of US companies, especially in the application of ICT. European trend growth has dropped to below 2% over the past decade or so. We expect this ground to be clawed back, but even so the EU will fall well short of its ambitions to match or even surpass the US.

What if Europe really got its policy act together? Our model suggests that if the EU15 had the same level of labour and product-market regulation as the US and by 2010 achieved the same level of ICT development as the US, average annual GDP growth in 2011-20 for the EU15 would be higher by 0.5 percentage points than under our baseline forecast—2.5% instead of 2%. Cumulatively, the impact would be large and allow the EU to narrow the gap in average living standards with the US. But don't bank on it happening.

Russia's long-term economic prospects are decidedly mixed. On the positive side, there is the much-improved political and macroeconomic stability

2. See appendix II for a fuller description of our forecasting methodology

of recent years. But the business environment remains difficult. An increased role for the state in the economy is likely to stunt entrepreneurship. And Russia faces a severe demographic challenge resulting from low birth rates, poor medical care and a potentially explosive AIDS situation. Its working-age population is likely to shrink dramatically by 2020.

The economy's dependence on energy also does not augur well for sustaining high long-term growth. High oil prices help state finances and boost short-term growth, but also crowd out the non-oil sector, encourage corruption and weaken the urgency to reform. No developing economy that is dependent on natural resources has grown fast, over a long period, in the past half-century. Even on relatively favourable assumptions about key policy variables and the pace of institutional change, our projections for Russia's long-term average annual growth per head are modest—3.7% per year.

Asia rising

Most Asian economies will remain among the fastest-growing in the world. Annual average GDP growth in the region in 2006-20 will be 4.9%. Growth will be driven above all by openness; the scope for productivity catch-up; relatively high quality of labour; the development of ICT; and regulatory and institutional reforms, albeit at a varying and sometimes disappointing pace. In some cases, mainly in southern Asia, demographic factors will also favour fast growth.

China is in a race to become rich before it gets old. GDP growth will slow from 8.7% a year in 2001-05 to 6% in 2006-20. A large part of the slowdown after 2010 (almost 1 percentage point in annual growth) can be attributed to China's changing demographic profile. Another source of slowdown is simply the price of success: the scope for catch-up growth is gradually reduced as the gap between Chinese productivity levels and those in the world's technological leader narrows.

Nevertheless, even average growth of 6% a year over 15 years would be impressive. China's strengths

The world's largest economies

	GDP (US$bn, at PPP)				GDP (US$bn, at market exchange rates)			
	2005	World rank	2020	World rank	2005	World rank	2020	World rank
United States	12,457	1	28,830	2	12,457	1	28,830	1
China	8,200	2	29,590	1	2,225	4	10,130	2
Japan	4,008	3	6,795	4	4,617	2	6,862	3
India	3,718	4	13,363	3	759	12	3,228	7
Germany	2,426	5	4,857	5	2,829	3	4,980	4
United Kingdom	1,962	6	4,189	6	2,213	5	4,203	5
France	1,905	7	3,831	7	2,132	6	3,536	6
Brazil	1,636	8	3,823	8	787	11	1,600	13
Italy	1,630	9	2,884	10	1,720	7	2,543	10
Russia	1,542	10	3,793	9	749	14	2,692	8
Spain	1,151	11	2,427	14	1,119	9	2,146	12
Canada	1,071	12	2,423	15	1,122	8	2,206	11
South Korea	1,067	13	2,837	11	804	10	2,607	9
Mexico	1,059	14	2,459	13	752	13	1,450	14

Source: Economist Intelligence Unit

include a good physical infrastructure; a flexible labour market and relatively high health and skill levels; and a lack of obstacles to foreign investment and to establishing businesses. Rapid catch-up in productivity should be sustainable for many years yet. Large stocks of foreign direct investment (FDI) represent a long-term commitment to the country by international companies. China's accession to the World Trade Organisation (WTO) also commits the country to market liberalisation.

India's growing integration with the global economy and its favourable demographics are likely to ensure a sustained rate of growth of 5.9% a year in 2006-20. India's democracy is well entrenched; its legal system is generally impartial, if slow-moving, and its constitution is respected. However, India's much-discussed IT sector accounts for too small a share of GDP to be a long-term driver of growth. Much more will depend on the modernisation of the country's agriculture and manufacturing.

The growth outlook for the region's third major economy, Japan, is poor. Over the next 15 years Japan's population of working age will contract by almost 1% a year. The expected decline in the labour force and a poor productivity picture suggest weak potential output growth. Some reforms will be enacted, but the consequent productivity boost will be neither large nor long-lived. Over the next 15 years Japan's real GDP growth will average just 0.7% a year.

By 2020 China's GDP (at PPP) will have matched the US and the EU. India's GDP will have overtaken or be on the threshold of overtaking the biggest European economies. But most of Asia—including both China and India—will remain very much developing countries in 2020. Average GDP per head will still be less than one-fifth that of the US, compared with one-seventh in 2005. Some of the region's economies will have caught up with the US (Singapore) or be very near the US level (Hong Kong and Taiwan). But most of the rest of the region will be far behind. And it should be remembered that these ratios are when GDP is measured at PPP; at market exchange rates the ratios will be considerably lower, despite the catch-up growth and real appreciation of currencies over the next 15 years. For example, in 2020 China's GDP per head will be about one-quarter of the US level when measured at PPP, but still only a meagre 8% when GDP is measured at market exchange rates.

Latin America

Latin America's average rate of growth, at about 3%, will be an improvement on the performance of recent decades, but disappointing compared with potential and the much faster-growing emerging markets in Asia. Macroeconomic stability is being consolidated in the region and there has been progress in structural reforms. But the region's politics will make it hard to push through painful fiscal and institutional reforms. The growth of the working-age population will slow. The quality of human capital, in terms of the health and skills of the workforce, lags behind that of emerging markets in Asia and eastern Europe.

Still unipolar

In 2020 the US will remain the most important single country across all the dimensions of power as result of the size of its GDP, its military might, internal cohesion and persistent technological lead. The US dollar will remain the key international reserve currency. Europe will lack the cohesion to achieve superpower status. The transatlantic economic relationship will remain the most important globally, even if its relative importance—in terms of trade, investment and share of global GDP—falls as Asia's rises.

Asian development in recent decades has been remarkable by any standard. Our baseline economic forecast for Asia is for growth rates that in most cases continue to be the envy of the rest of the world. But this will prove insufficient by 2020 to displace the developed West from its predominance. Most of Asia

The consequences of ageing

Population dynamics will exert a profound influence on economic development patterns.

Demographic evolution tends to be gradual and highly dependent on previous and present developments, at least over a 15-year time horizon. Thus the degree of confidence one can have in demographic projections is fairly high. According to the US Census Bureau and Economist Intelligence Unit forecasts, the world's population in 2020 will be 7.43bn, compared with 6.42bn in 2005. In 2020 the world's most populous countries will be China (1.43bn compared with 1.3bn in 2005), followed closely by India (1.3bn, 220m more than in 2005), with the US a distant third with 336m (296m in 2005).

Some countries will age faster than others. Take the old-age dependency ratios (the over-65s as a share of the population aged 15-64). Whereas the ratio in the EU25 will reach almost one-third in 2020 (it was 25% in 2005), in the US it will rise to only 25%, from 19% in 2005. The EU's average population profile will become somewhat younger with Turkey's accession. Turkey's old-age dependency ratio will still be only 13% in 2020.

Japan's fertility rate, at 1.3 births per woman of child-bearing age, is among the lowest in the developed world. By 2020, the old-age dependency ratio will have risen to 46% (from 29% in 2005). The rate of decline of Japan's labour force will accelerate after 2010, to almost 1 percentage point a year.

The potential risks are great. These include slower economic growth, financial-market instability and difficulties in funding pension systems. Although many countries in Europe have started to reform their pension systems, the reforms have generally not gone far enough to avert a future fiscal crisis. Countries will have to offset the rising share of pensioners by getting the unemployed into jobs, by making people work longer and by encouraging immigration. More women will be drawn into the workforce, too—a majority of the respondents to our executive survey expect to see an increase in the proportion of female employees over the next 15 years.

Yet these trends also present new opportunities for business and economic development. In Japan, arguably the world's laboratory for addressing demographic change, population ageing appears to have triggered a productivity-boosting wave of innovation. Japanese companies have, for example, been pioneers of so-called dark factories, where integrated automation has eliminated the need for human workers altogether.

Firms are also eyeing the "grey wallet" as a source of increased demand. Japan's leading manufacturer of feminine-hygiene products and nappies, Unicharm, is a case in point. With its core business particularly badly hit by population shrinkage, the firm has been busily diversifying into healthcare (including nappies for adults) and even pet care (including nappies for dogs), reckoning that demand for pets will rise quickly as the numbers of elderly people on their own also increase.

will in 2020 remain poor compared with the developed West, even after 15 more years of rapid catch-up growth. And our baseline forecast could be seen as close to a best-case scenario: the region faces many downside risks—from reversals in globalisation to the spread of infectious diseases, from geopolitical tensions to domestic social upheaval.

Too often, commentators are mesmerised by China's astonishing rate of growth. Many have been busy constructing alarmist scenarios of the future for the West, by simply extrapolating present Chinese rates of growth into the future. There is a long tradition of similar prophecies—including predictions in the 20th century of the inexorable rise and dominance of Germany, Japan or Russia. All proved wrong.

The "Asian century" will not become apparent before 2020 and possibly not even for several decades after that. Asia will narrow the gap in wealth, power and influence, but it will not close it.

Job markets

A number of key features can be identified in likely global trends in employment and earnings over the next 15 years.

Slowing growth of employment

Demographic factors and declining opportunities for raising labour force participation rates, as well as the modest slowdown in output growth in the second half of the forecast period, will lead to a fall in the rate of growth in global employment. Annual average employment growth is projected to slow from 1.4% in 2006-10 to 0.8% in 2010-20, giving an annual average growth rate of 1% in 2006-20.

The gradual slowdown in employment growth throughout the forecast period will be a universal phenomenon, although the actual rates of employment growth will vary sharply across different regions. Developing Asia will account for some two-thirds of the increase, with India alone making up 30% of the net increase in global employment with its 140m new jobs.

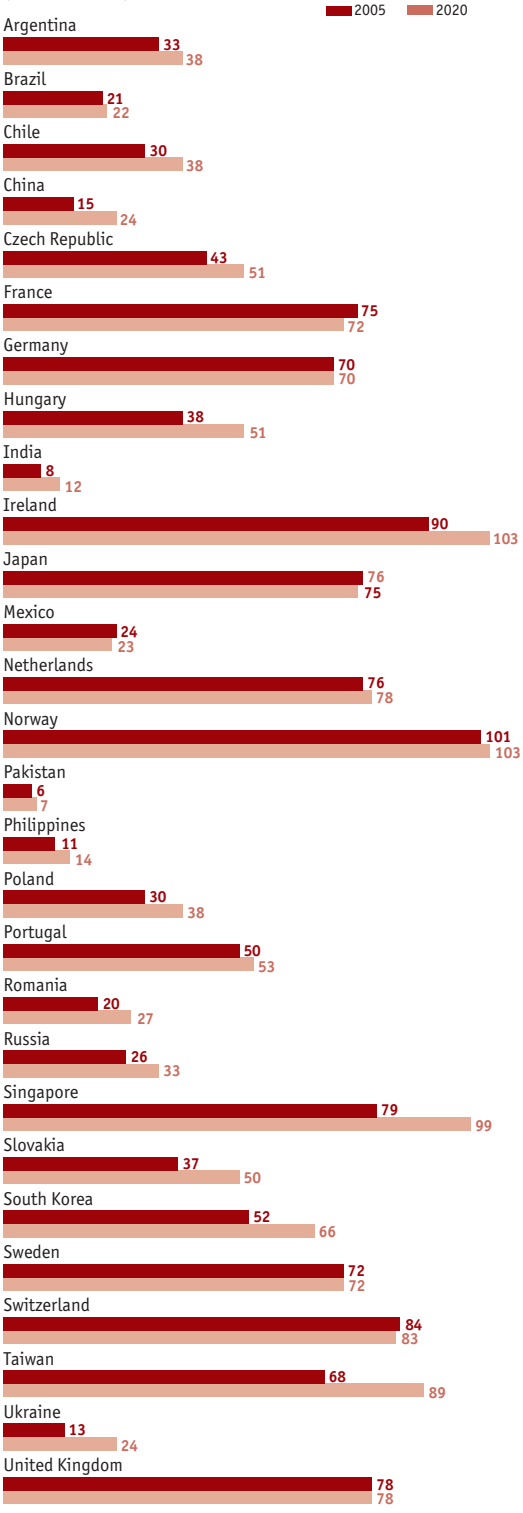
Global shifts in sectoral employment shares

For developed countries, the transfer of jobs from the manufacturing sector (especially, but not only, labour-intensive activities) to emerging markets will continue. At the same time, fears of the death of Western manufacturing are unfounded (see the chapter on the manufacturing industry).

Almost all net increases in employment in the US and Europe will be in the services sector, especially its higher value-added segments. In the US new technologies in IT, biotechnology and pharmaceuticals will underpin output growth and account for a significant share of the increase in total employment.

In the US employment in services industries is expected to increase from an already high rate of some 85% to well over 90% of total employment in the non-

GDP per head
(US = 100 at PPP)



Source: Economist Intelligence Unit.

farm sector. Education, healthcare and professional and business services will have the strongest projected employment growth, probably about twice the rate of the overall economy.

Pressure on wages

Globalisation will continue to cause big shifts in the relative prices of labour and capital. The full entry of China, India and eastern Europe into the global economy has roughly doubled the size of the global labour force. This has exerted downward pressure on average wages throughout the world, certainly relative to the return on capital.

There has thus been a tendency for the share of wages in income to fall and that of profits to rise. But clearly not all categories of workers have been equally affected. In the developed world, lower-skilled workers will continue to lose out relative to skilled workers. However, even those workers experiencing pressure on their wages will benefit as shareholders and future pensioners from a more efficient use of global capital.

Over the long term, labour productivity growth will determine the rate of increase of real wages. The employment-weighted average world monthly gross wage in nominal US dollar terms will approximately double between 2005 and 2020, to some US$1,200 (an annual average rate of growth of nearly 5%). The growth of real wages, in constant price terms, will of course be slower—at about 2.5% per year, in line with labour productivity growth. This means that the world's average worker will be some 45% better off in 2020 than he is today. This would be a significant improvement, especially in view of the downward pressure on wages discussed above.

New jobs in the world economy
(2005-20)

	millions	% of world net increase
Developing Asia	315.5	67.0
of which China	65.0	13.8
India	142.4	30.2
Latin America	45.0	9.5
US	12.5	2.6
EU25	8.4	1.8
Total	**471.3**	**100.0**

Source: Economist Intelligence Unit.

The world average masks considerable inter-regional variation. Strong productivity growth and real currency appreciation will underpin much faster growth in US dollar wages in many emerging markets, especially in Asia and eastern Europe. China's average US dollar wage is projected to grow by a factor of 4.5 between 2005 and 2020. India's different labour market dynamics imply slower growth, although even here US dollar wages are expected to triple. In the new EU member states of eastern Europe US dollar wages are forecast to increase 2.5 times.

In Latin America, by contrast, the trend is expected to be far more subdued, and indeed the gap between developed countries' and average Latin American wages is actually expected to widen slightly between now and 2020. For example, the average wage in Brazil is now double that in China and India. By 2020, Brazil's average wage is expected to be some 30% below China's average wage.

Reduction in poverty levels

Over the past two decades, hundreds of millions of people (mainly in Asia) have been pulled out of poverty. However, of the 2.8bn workers in the world at present, astonishingly nearly one-half of the world's workers still do not earn enough to lift themselves and their families above the US$2 per day poverty line. Among these "working poor", over 500m workers and their families live in extreme poverty on less than US$1 per day. Although our projections of income growth and structural shifts imply that several hundred million more people (especially in India) will emerge from poverty over the next 15 years, a significant proportion of the global labour force and their families will by 2020 still remain below the poverty line.

Alternative scenarios

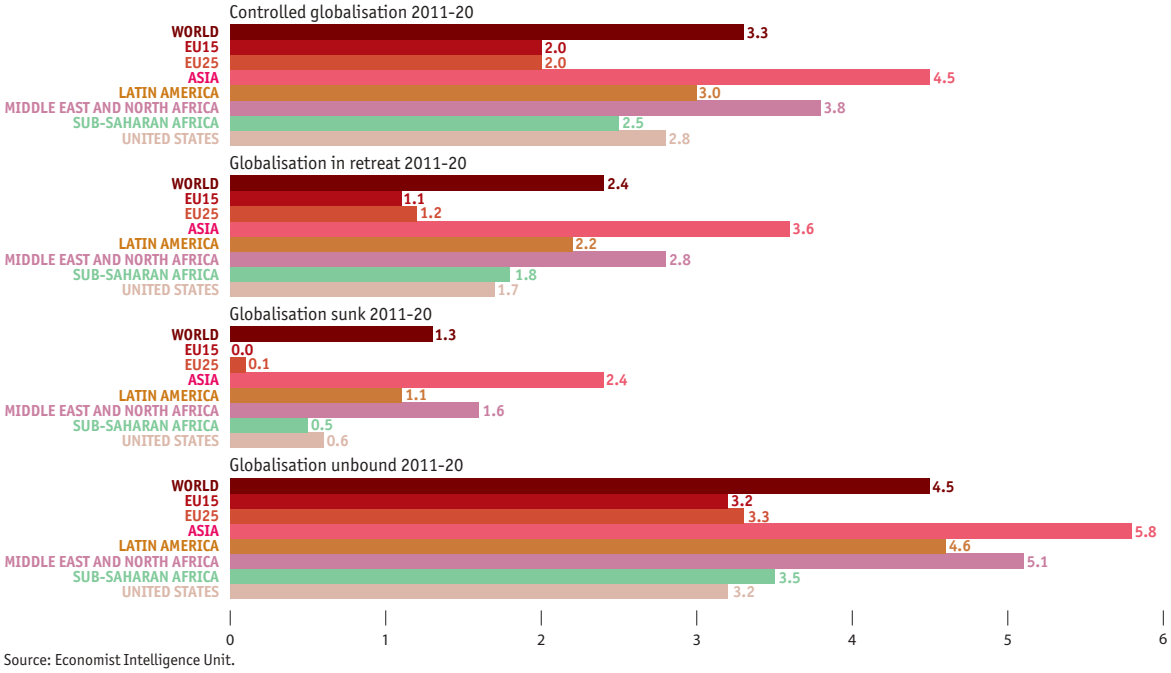
Our baseline forecasts assume that globalisation will continue, but the process will not be without setbacks. The baseline scenario that we call *controlled globalisation* implies a significantly less open world than at one stage, during the 1990s, seemed possible—before the bursting of the dotcom bubble, the September 11th attacks on the US, corporate scandals and the EU's malaise dampened spirits and altered attitudes. The rise of China and the economic weakness within the EU have also strengthened protectionist forces. Still, the forces that underpin globalisation remain powerful, in the form of global business sentiment, the increased lobbying clout of developing markets and broad consensus about the benefits of trade liberalisation.

The process could be stopped, however, just as previous eras of globalisation were reversed. Alternative scenarios are possible, based on a partial reversal of globalisation (*globalisation in retreat*) or its unwinding (*globalisation sunk*). An upside scenario (*globalisation unbound*) is also possible, although unlikely. To explore the potential impact of these scenarios further, we used our model to trace the likely quantitative effects of changes in key growth drivers such as the extent of trade integration and of regulatory, institutional and technological change. We assumed that the alternative trajectories start from 2010.

Baseline scenario: Controlled globalisation (65% probability)

Our baseline scenario assumes further gradual trade liberalisation that is in part constrained by security concerns and protectionist pressures. It envisages no major international disruptions or conflicts over the next 15 years. The worldwide trend of liberalisation of

Alternative scenarios
(annual average rates of growth in real GDP, %)



Source: Economist Intelligence Unit.

foreign investment continues. Protectionist sentiment is on the rise in the US and in parts of the euro area. Periodic trade conflicts are likely. However, protectionism remains in check and the overall trend will be for further gradual liberalisation. The backlash against China will remain limited. Major US companies such as Wal-Mart, GM and Motorola have big stakes in China and, together with many other companies, are important lobby groups in the US pressing for good US-China ties. Two-thirds of the respondents in our executive survey believe that China's development to 2020 represents more of an opportunity than a threat to their businesses.

Alternative scenario I: Globalisation in retreat (20% probability)

Protectionist sentiment thrives in a climate of insecurity. There are worries over food safety, epidemics (avian flu) and the impact of technology. Throughout much of Europe, economic weakness and high unemployment breed insecurity. Fears about the outsourcing of jobs to China and India are out of all

Improving business environments

The past decade has seen a considerable improvement in the global investment climate. This trend is captured in the Economist Intelligence Unit's global business rankings model, which measures the attractiveness of the business environment (the opportunities for and hindrances to the conduct of business) and its key components across 60 major economies.

Over the past decade countries have moved up and down the global rankings, but the overall trend has been for an ongoing improvement in the quality of the investment environment in almost all countries. In particular, this has characterised policies towards foreign investment, and foreign trade and exchange regimes. Reforms and liberalisation have improved product, financial and labour markets and tax regimes. Reversals have been few and far between. The changes have been most marked in the world's fastest-growing economies and major recipients of FDI in the emerging markets of Asia and eastern Europe.

In the table, we compare expected trends in the next decade in several key areas of the business environment that are also among the main drivers of economic growth—government regulation, institutional quality, education and ICT development. The average situation in this decade, the 2000s, is compared with the projected situation in the following decade, the 2010s.

The emerging markets in Asia and eastern Europe are expected to record the most significant improvements. In the developed world, especially the US, most market categories are already liberalised and institutions are advanced, which naturally limits the scope for further improvement.

In general, deep institutions such as the rule of law and the quality of public administration are persistent over time and, other than in exceptional circumstances, change only very slowly. Thus the expected upgrades in this area are limited, compared to regulatory change, which is easier to implement. Labour market reform, in particular, is expected to make headway in most regions, followed by reforms in product markets.

ICT development will remain rapid, even if not as fast as in the previous decade. Although the EU and leading emerging markets will be catching up in this area, our previous research suggests that ICT begins to deliver GDP per head growth only after a certain threshold of development is reached; that ICT deployment and use begins to affect economic growth only after an adjustment period; and that the rewards of ICT depend on a complex interaction between technology and a range of other complementary factors relating to the business environment. As a result, the US will continue to reap disproportionate benefits from being the world leader in the development and application of ICT.

proportion to the real economic stakes involved: only a small proportion of the estimated 1.5bn service jobs in the global economy can be performed remotely. But the mere threat of jobs being lost to emerging markets keeps wages down in the developed markets and could yet provoke a major backlash against globalisation.

This scenario would shave 1 percentage point off global growth in 2011-20, relative to the baseline forecast—cumulatively, a large amount of lost world output in the next decade. But the assumed changes in the drivers are by no means radical and illustrate how easy it might be to slip from *controlled globalisation* to *globalisation in retreat*.

Alternative scenario II: Globalisation sunk (5% probability)

Globalisation in retreat is not the worst-case scenario. Historians have observed some uncanny parallels between the world today and the world on the eve of the first world war at the end of the golden first age of globalisation that lasted from 1870 to 1914. That era was marked by a high degree of international mobility

The business environment—regulation, institutions, skills, and information and communications technology (ICT)
(index values of 1 to 10, 10 being optimal, except for mean years of schooling)

	Government Regulation	Product markets	Financial markets	Labour markets	Institutional quality	Mean years of schooling of adult population	ICT[a]
The 2000s							
World average	7.2	6.9	8.1	6.5	6.7	8.2	3.9
US	9.8	10.0	10.0	9.5	8.7	12.8	8.6
EU15	8.2	8.1	9.4	7.1	8.9	11.0	6.9
New EU member states	7.8	7.8	8.3	7.3	7.3	9.4	4.2
Developing Asia	7.1	6.7	7.7	6.8	6.0	6.9	3.9
of which China	7.0	6.3	7.8	7.0	4.0	6.4	2.5
India	5.9	5.5	6.6	5.5	5.2	5.1	3.0
Latin America	6.5	6.3	7.3	5.8	5.4	6.8	3.2
Middle East and North Africa	5.7	5.5	6.4	5.3	5.0	6.2	3.0
The 2010s							
World average	7.6	7.3	8.2	7.3	6.9	9.1	5.1
US	9.9	10.0	10.0	9.8	8.7	13.0	9.6
EU15	8.6	8.3	9.6	7.8	9.0	11.3	8.3
New EU member states	8.1	8.0	8.4	8.0	7.6	9.8	5.4
Developing Asia	7.3	7.1	7.7	7.3	6.2	7.6	4.7
of which China	8.0	7.8	7.9	8.3	5.0	7.0	3.5
India	6.4	5.8	6.8	6.6	5.8	6.0	3.8
Latin America	7.1	6.8	7.7	6.8	5.6	7.4	4.0
Middle East and North Africa	6.0	6.0	6.4	5.7	5.4	7.2	3.6

(a) In 2000 for 2000s; in 2010 for 2010s.
Source: Economist Intelligence Unit.

of goods, capital and labour and the dominance of a free-trade orthodoxy that was periodically challenged by protectionist sentiment. There was relatively free trade, hardly any limits on capital movements and freer immigration than today. The first world war wrecked all this. Global markets were disrupted, technical advances petered out, and stagnant consumption discouraged innovation. By the end of the 1940s most states in the world had imposed restrictions on trade, migration and investment.

The consequences for growth of this scenario would be disastrous. Global growth in 2011-20 would drop to a mere 1.3%, implying essentially stagnant world per-capita incomes. The hardest hit would be the emerging markets, especially the poorest ones.

Alternative scenario III: Globalisation unbound (10% probability)

Under the most benign scenario we assume that trade barriers are progressively dismantled; there is accelerated technological progress and fast dissemination; financial markets become ever more integrated, fostering an efficient allocation of global capital; and freer flows of labour produce higher remittances and crossborder flows of knowledge, fuelling growth in many developing economies. Big increases in FDI would be driven by regional integration schemes, another wave of global merger and acquisition (M&A) activity, competitive pressures and the increasing sophistication of financial markets. Under our baseline forecast, annual global inflows of FDI amount to 2-2.5% of GDP. Under *globalisation unleashed* these would rise to about 4% of GDP, the rates of the late 1990s. By 2020 the world stock of inward FDI would amount to some US$47trn, or more than 40% of world GDP—a rate of FDI penetration that is today matched or exceeded by only a few countries.

As in *globalisation in retreat*, the consequences for world growth would be considerable, although in this case positive: 1 percentage point in additional growth per year relative to the baseline.

The US holds the key

US policy will be the main determinant of which model emerges. However, the US can no longer be viewed as an unambiguous champion of unfettered globalisation and associated international political processes. For one thing, there has been a marked worldwide decline in respect for the US, which constrains US influence. For another, there is what might be called the "paradox of globalisation": the fact that US benefits from *globalisation unbound* would be fairly limited, with others (especially Europe and Asia) standing to gain far more.

Indeed, the shift in the global distribution of income—relative to the baseline—would clearly be unfavourable to the US. EU growth rates would match those of the US and exceed US growth in per-capita terms. The EU economy would be much bigger than the US in 2020. The additional 1 percentage point in Chinese annual growth would also mean that the Chinese economy would outweigh the US (in PPP terms).

It is unclear to what extent such considerations influence US strategic thinking. In so far as they do, it may not always be easy to calibrate policy towards *controlled globalisation*—the optimal US strategic result—without the risk of undermining globalisation altogether (*globalisation in retreat* or *sunk*), when everyone, including the US, loses heavily.

Chapter 2 Industries

Different sectors face a variety of threats and opportunities over the next 15 years. The following section comprises a series of essays on the outlook for eight different industries between now and 2020. The essays are based both on qualitative interviews and on the survey results for respondents in the relevant industry.

Foresight 2020: Automotive at a glance

The global marketplace: Emerging markets, notably India and China, will be the engines of industry growth over the next 15 years. By 2020 almost 40% of the industry in terms of sales will be in Asia. Production of components will shift to emerging markets too, although the location of capital-intensive final assembly plants will not change dramatically.

Products and services: Small, easy-to-drive and low-cost cars will make up the bulk of the market thanks to rising demand in, and competition from, emerging markets; declining customer loyalty in developed markets; and demographic and environmental pressures. There will still be a niche for upmarket, higher quality vehicles. Those in the middle market will face the toughest time.

The industry landscape: Diminishing economies of scale will halt and reverse the trend of consolidation. Instead of being dominated by six companies with more than 75% of global production, as was the case in 2005, there are likely to be many more firms with a substantial slice of the pie in 2020.

Changing relationships: There will be an "unbundling" of the downstream end of the business as the relationships between consumers and car dealers dissolve. Car manufacturers will work harder to create direct ties with the end-consumer.

Corporate strategies: Operational efficiency will define the automotive winners of 2020. For almost all carmakers, competitive advantage will lie in cost minimisation, making the car ever cheaper, and in greater efficiencies in areas such as the supply chain and product development, both of which will be focal points for IT investment.

53 automotive respondents took the survey. Two-thirds of them came from large companies and one-third were board-level executives.

Key survey data

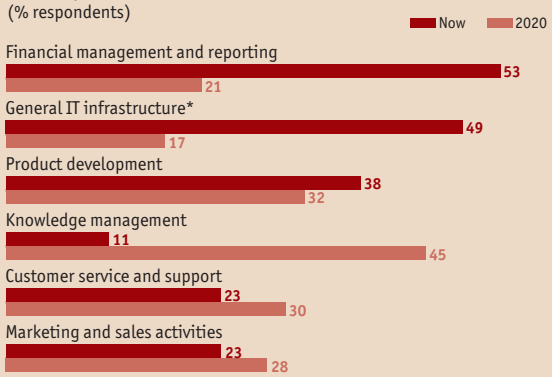
60% of respondents think that operations and production processes offer the greatest potential for productivity gains.

Which of the following areas of activity offer the greatest potential for productivity gains over the next 15 years? Select up to three activities. (% respondents)

Source: Economist Intelligence Unit survey, 2005, automotive respondents.

The focus of IT investment will shift from financial reporting and general IT infrastructure to knowledge management, supply-chain management and product development.

What are the top three areas of focus for IT investment at your organisation now, and what will be the top three areas of focus over the next 15 years? Select up to three activities. (% respondents)



* Computer performance, personal computers/devices etc.
Source: Economist Intelligence Unit survey, 2005, automotive respondents.

What will the automotive industry, the world's biggest industrial sector, accounting for more than 10.5% of developed-world GDP, look like in 2020? Not the same, that's for sure.

In 2005 one-quarter of the industry by sales and 35% by production was based in Asia, with 10% in Japan alone. By 2020 almost 40% of the industry in terms of sales and 55% in terms of production will be in Asia. "With China and India harbouring the two largest populations in the world, and with their rising prosperity, they will be the engines of growth for the next few decades", says Anand Mahindra, vice-chairman and managing director of upcoming Indian carmaker Mahindra and Mahindra.

For the past 30 years, the industry has grown at a compound rate of only just over 1% a year. Tapping into the huge potential sales in India and China will bring a new boom. The industry will consequently be much larger in 2020, around 65% larger, in terms of production, according to one of the industry's most famous sons. "By 2020 the auto industry will have reached an annual production of 100m vehicles [a year], mostly due to demand in Asia", says Dr Carl Hahn, former chairman of Volkswagen AG.

Despite Asia's cost advantages, the location of final assembly processes is not likely to change greatly. The business of assembling cars will become even more capital-intensive, not labour-intensive, keeping plants in Japan, Europe and the US at the top of world productivity league tables.

But there will be a big shift in the production of components. More than half of the automotive industry respondents to the Foresight 2020 survey think that there will be an increased number of suppliers to interact with in 2020, reversing the trends of the past decades. "I see an increasing output of components emanating from India and China", says Mr Mahindra. "It's not just because of lower wages but because of the astonishingly low cost of engineering talent. New product development, value engineering, plant engineering and other such processes will be carried out at lower costs in these two countries and will drive offshoring."

As for the products that companies will be selling, high-specification vehicles will retain the top end, even if the market for them is limited. In other product segments there will be more and more pressure to lower costs. With a polarisation of the market based on price at one end and quality and driveability at the other, the race will be on to do away with middle-market products.

Almost 80% of the survey respondents in the automotive industry believed that the industry would see a commoditisation of products and services. The poor but vast mass markets of China and India will drive a trend towards smaller, "cheap and cheerful" cars in developing countries. There is also likely to be rapid growth in the second-hand market in China and India, a sector that is still embryonic today. The greater availability of consumer finance and lower prices, as well as a wider road network, will enable "even villagers to [adopt] cars and ownership [to become a reality] for the economically lower strata of society", says Ravi Kant, CEO of India's Tata Motors.

Low-cost cars are also likely to take a larger share of the pie in developed markets. There are likely to be fewer models in 2020, or at least fewer platforms, to save costs. "Engine sizes will be smaller with fewer platforms and more body types", says Andreas

Vroom
Automotive sales by region

	1999	2010	2020
Nafta	18,619,400	19,140,000	22,000,000
South and Central America	2,179,405	4,549,000	7,500,000
Western Europe	16,881,397	18,071,500	18,000,000
Eastern Europe	2,501,904	4,815,471	8,000,000
Asia	11,653,000	22,189,000	38,000,000
Rest of the world	2,558,322	4,029,800	6,500,000
Total	**54,393,428**	**72,794,771**	**100,000,000**

Source: Autopolis.

Hello Tata

Almost everyone thought he would fail. To try to enter the world's largest manufacturing sector, the "industry of industries", where economies of scale count for so much, was folly. To try and do it with only a few hundred million dollars and in a country with only the most basic of road systems seemed harder still. And yet Ratan Tata, the chairman of Tata Motors, based in Pune, India, has done it. Moreover, his company seeks now to change the rules of the industry game.

Though few people have heard of Tata outside India, they increasingly will. The owner of a steel business, a hotel chain and a rising star in the telecoms and IT services sectors, the holding company, Tata Sons, had a market capitalisation more than twice that of General Motors in January 2006.

The company's foray into the car business started in the 1990s when its first vehicle, the Indica, was launched to mostly critical wailing. The car looked good but teething and quality problems meant sales were slow at the start. Over the next few years the company steadily addressed these problems and then launched a second version of the car, the V2. A three-box version, the Indigo, followed soon after and then a hatchback. Sales began to climb and by the end of 2005 Tata had 18% of the Indian car market and an output approaching 200,000 vehicles a year.

Tata's quality problems have not been entirely addressed, even today, but there are plans in place to improve the situation further. Much more of the car is now out-sourced, often to local companies that have international alliances allowing them access to world-class technologies. It will be another few years, admits the management, until they get it absolutely right. But the company has already beaten the odds, entering the car market for a song and achieving quality levels good enough to export the car to Europe.

It is what comes next that traditional rivals should fear most. Tata announced plans a few years ago to build a "Rs1 lakh" car—the equivalent of about US$2,000. The potential to "go down the pyramid", to tap into the vast market in developing countries currently served only by motorcycles or three-wheelers, is the primary goal, but Tata also wants their car to meet the toughest European safety and emissions legislation.

Swift progress is being made. Prototypes are built and the management is committed to bringing the car out in 2008. Tata claims that it can achieve major savings by having high quality engineers develop the product in India at much lower cost. The car may even be built in a modular way so that it can be assembled by dealers in remote villages.

Some rivals say that the sums of the Rs1 lakh car simply don't add up. But Tata already sells a small truck, called the Ace. Demand has been so good that the company has had to restrict sales to only three of India's states and add a second production line. Tata says it has recovered all the development costs already. Small, gleaming white, looking a little like a Japanese mini-truck and with a 750cc engine (they cut the one from the Indica in half), it can carry about a tonne. And it's also pretty good to drive, as your correspondent discovered on a recent trip to Pune. The cost? Just Rs1.3 lakh.

Andrikopoulos, managing director of one of Europe's largest car dealers, the Singelidis Group.

Customer loyalty is already waning in most of the developed markets of Europe and in the US, "even for upline vehicles", says Kai-Uwe Seidenfuss, vice-president of DaimlerChrysler. More than half of the auto industry respondents to our survey felt that the risk of waning customer loyalty was high or very high over the next 15 years. "The nameplate and the manufacturer become a 'who knows, who cares' couplet. We will see the loss of loyalty and the meaninglessness of image", predicts Professor Fred Bollig of the University of Michigan.

"It could well be that we will see an 'Apple-follower' type of car buyer, favouring simplicity," says Mr Seidenfuss. Designers will focus less beneath the hood, more on interiors. Seats will become thinner, dashboards will be smaller and interior lighting will become more important. "The car will be a much nicer place to spend time in than we are used to today", says David Wilkie, head of interior design at Stile Bertone, an automotive design house.

Demographic trends will cut both ways. "There will be a 'retirement car' phenomenon in the developed markets such as Japan where [buyers will] use their funds to get 'that one Mercedes' that they never had before", says Mr Seidenfuss. Others believe that cars that are easier for the elderly to use and drive, and

that meet the needs of people with lower disposable incomes than those in employment, will find a ready market.

There is still hope for brand power in the developing markets and in niche segments. "Customer loyalty might wane in the value-for-money segments as the offerings in this arena multiply", says Mr Mahindra. But that may not be the case in other segments or in the newer markets, he believes. "Loyalty in the upmarket and niche sectors will increase as people struggle to demonstrate how they are 'different' from the masses buying those 'utility wheels'," he says. "I [also] think the [developing] countries will surprise the world by the growth in demand for brand- and style-intensive products".

For the vehicles themselves, environmentally friendly fuelling and hybrid technologies will be a major focus. With more than 75% of our survey respondents believing that environmental issues will be a significant determinant of corporate strategy, it is easy to see why some forecasts predict that vehicles using alternative fuels or hybrid engines could account for as many as one sale in five in 2020. Given expectations of continued volatility in oil prices and India and China's need to import oil, the proportion could be even higher.

For the vehicle assemblers, the chances of a major change in technology in the next 15 years are seen to be much lower. Vehicle assembly will be much the same as today, although even more automated. The only prospect for radical change lies in the emergence of "daughter assembly operations", perhaps in places as small as dealers, to put some of the lower-cost cars together at the point of sale. For almost all carmakers, technological competitive advantage will lie in cost minimisation, making the car ever cheaper.

The shifting industry landscape

The industry is not expected to become more concentrated in the next 15 years, reversing a 100-year old trend. Instead of being dominated by six companies with more than 75% of global production, as was the case in 2005, there are likely to be many more firms with a substantial slice of the pie in 2020.

"Economies of scale are plummeting in the industry: subassemblies are delivered increasingly by vendors, marketing costs are being reduced by the use of unconventional and web-based marketing, assembly break-evens are being dramatically lowered, and even R&D costs are going down with offshoring", says Mr Mahindra. "This engenders the survival of smaller, nimbler and focused players who, not surprisingly, no longer have General Motors as their role model!"

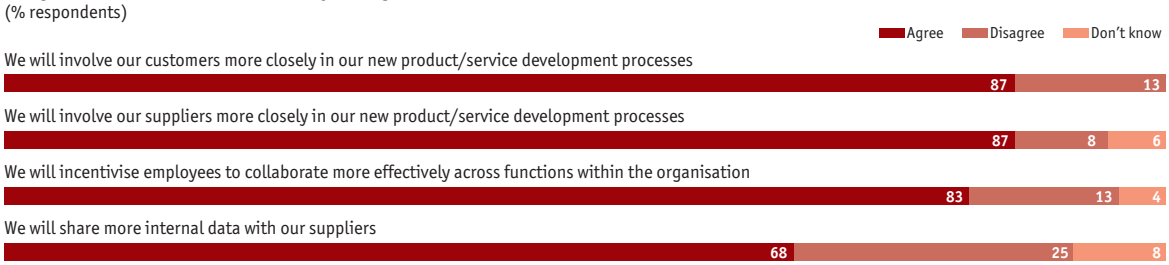
These players can expect to have more intimate relationships with their customers than they do now. In Europe, controversial Block Exemption legislation, which stops general retailers selling cars and allows carmakers the right to maintain exclusive dealerships, will have been replaced by 2020.

Most carmakers will become suppliers to multi-franchise dealers, or mass retailers, selling commodities based on price and value. Sales and information gathering will increasingly be done over the Internet for many products, with showrooms often just for looking. "Retailing will be revolutionised towards Wal-Mart type structures", says Dr Hahn.

Thanks to lower retail costs and improved performance—Dr Hahn, for one, predicts 200,000km-plus warranties—there will also be a dramatic reduction in car maintenance, meaning that the car owner will use the repair and maintenance shop far less. What limited servicing there is will be done by specialists.

Both these factors mean that contact between the car owner and the traditional dealer will all but evaporate over the next 15 years. The breaking of the link between traditional dealers and car-buyers will make it harder for those that sell cars to maintain relationships with their customers. As a result,

How do you expect the following aspects of your organisation to change over the next 15 years? Please state whether you agree or disagree with these statements about your organisation in 2020.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, automotive respondents.

manufacturers will use web-based and other new communication technologies to reach out directly to customers, over the heads of dealers, in order to build strong relationships and enable greater personalisation of products and services.

The survey bears this prediction out. More than 90% of respondents anticipate an increase in the amount of interaction between carmakers and customers. They also expect that marketing, sales and customer support will become a greater focus for IT investment over the next 15 years. "Carmakers understand that design, branding and marketing are their key capabilities now, not only metal-bashing", says Mr Seidenfuss.

Relationships with suppliers will change, too. Suppliers remain the heart of the industry, accounting for two-thirds of a vehicle's value. Almost all of the respondents to the Economist intelligence Unit's survey believe that relationships with suppliers and other outside parties will be more important as a source of competitive advantage in 2020, particularly in a market that will stress cost efficiency or quality over mid-market products. Almost 90% of the respondents to the questionnaire said that they would involve suppliers more in the product development process, with 68% saying they would share internal data with them.

In this environment, efficient sharing of knowledge will be critical. Whether responding effectively to the rising demands of end-customers or working more smoothly with suppliers, companies will need to capture and share data within and across organisational boundaries. The focus of IT investment will shift dramatically as a result, according to our survey respondents, away from current spending on financial reporting and general IT infrastructure towards knowledge management, supply-chain management and product development.

Blinkered?

How far could commoditisation go? Will even the carmakers have unbundled in 2020? Could companies like Wal-Mart be badging cars, outsourcing the design and assembly to specialists? It's possible, but not likely. "We should not presume that a scenario of a Wal-Mart or a Tesco badging cars could not occur", says Mr Mahindra. "[But] cars are still the ultimate expression of a person's freedom and desire; they are projections of who the owner thinks he or she is, or would like to be. I don't think they'd want to carry a vehicle home along with a loaf of bread!"

Maybe so, but carmarkers cannot afford to be complacent. Both the survey respondents and interviewees alike expect a growing commoditisation of the bulk of the car market. They expect to be confronted by less loyal buyers and further price pressures. A bifurcation of demand between a low-cost mass market and a limited top-end is widely anticipated in both developed and developing markets. More than half of the respondents believed

that having a low cost base would become more important than now. Automotive executives pick increased automation of processes as their principal focus for improved productivity.

The question is whether industry executives can really change their spots. Only 15% of the respondents to our survey say that having a low cost base is critical to their competitive advantage now, focusing instead on areas such as brand strength and the capacity to customise products. Important though these factors are, executives who continue to believe that they can add enough value though marketing and customisation will suffer the consequences.

Consumer goods and retailing

Foresight 2020: Consumer goods and retailing at a glance

The global marketplace: Emerging markets, particularly China and India, will provide significant growth opportunities over the next 15 years. By 2020, China will match the US as the world's largest consumer market. Income levels will still lag well behind those of mature markets, however, limiting growth in mid-market segments.

Products and services: Emerging markets will be going through known phases of development, as consumers become more demanding, segments consolidate and products proliferate. In mature markets, product innovation will be spurred by new trends such as demographic shifts and rising environmental awareness.

The industry landscape: Cost-control strategies and rising levels of supplier quality will ensure increased sourcing from low-cost countries. Diminishing economies of scale and regulatory barriers will slow the trend of consolidation in mature markets.

Changing relationships: More intimate relationships with customers and suppliers will be essential. Customers will place more weight on personalised service; suppliers will be integral to product development. Training, recruitment and IT investment will shift to reflect the importance of these relationship-management skills.

Corporate strategies: In mature markets, an efficiency frontier is in sight. Strategies to control costs will reap diminishing returns and new approaches will be needed to gain sustainable competitive advantage. The focus will increasingly be on the quality of customer relationships at the point of sale, delivery and post-sales service.

122 consumer goods and retailing respondents took the survey; 60% of them came from large companies and one- third were board-level executives.

Key survey data

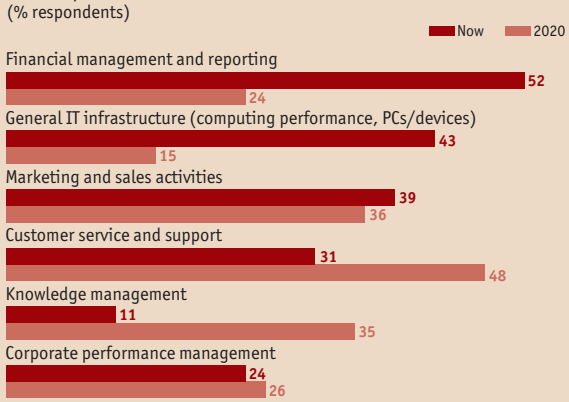
Management and interpersonal skills will be most important to organisational success.

Which skills will be most important to your organisation's success over the next 15 years? Select up to three options.
(% respondents)

Source: Economist Intelligence Unit survey, 2005, consumer goods and retailing respondents.

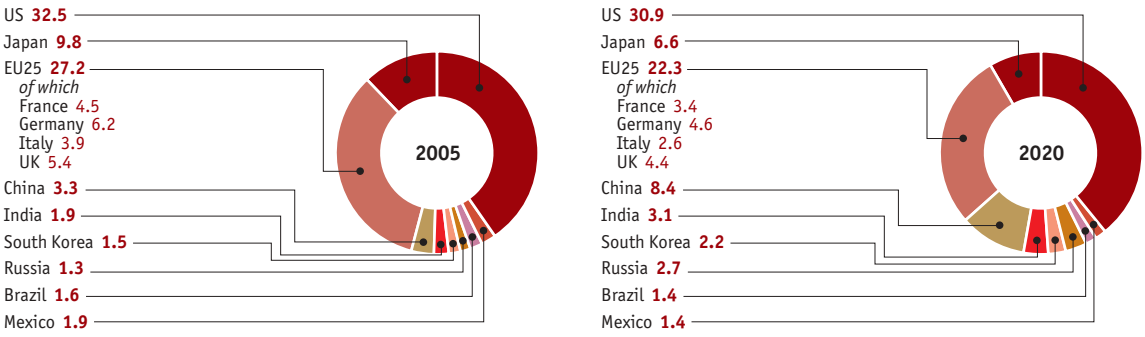
Over the next 15 years, the focus of IT investment will shift towards customer service, knowledge management and business development.

What are the top three areas of focus for IT investment at your organisation now, and what will be the top three areas of focus over the next 15 years?
Select up to three activities.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, consumer goods and retailing respondents.

Share in world consumer spending
(%)



Note: The EU is expected to have 28 states in 2010 and 33 in 2020.
Source: Economist Intelligence Unit.

When retailers and consumer packaged goods (CPG) firms look 15 years into the future, they see two broad areas of growth opportunity: entering emerging markets and increasing sales in existing markets. The challenges in each will be daunting and different.

A majority of survey respondents in these industries expect their greatest growth opportunities between now and 2020 to lie in non-OECD countries. In 2020 the US will still (at market exchange rates) be by far the biggest consumer market in the world: its share of world consumer spending will remain roughly constant, at just under one-third. The share of the EU will steadily decline, but still be above 20% by 2020. But much of the increase in global consumer spending over the next 15 years will occur in the leading emerging markets, and in China and India in particular.

Measured at purchasing power parity, China will have closed the gap with the US by 2020. In many key segments, China will by 2010 already match or surpass the US market. By 2020 it will match the US as the largest consumer market in the world. There are 12m Chinese households today with annual incomes greater than US$7,500; by 2020 there will be at least 80m such households.

However, although China's middle class could make up as much as 40% of its population by 2020—double what it is now—it would still be well below the 60% share in the US. And per-capita income for China's middle class will be far below equivalents in the West.

Global companies have recently also begun to pay more attention to India as the increasing number of urban consumers has sparked a mini consumer boom. Unlike consumers elsewhere in Asia, Indians appear more prepared to spend than to save. However, India's consumer boom will be constrained by low average incomes and restrictions on foreign investment in the retail sector. In India there are now some 300m middle-income earners making US$2,000-4,000 a year.

The spread of India's middle class relies in large part on the growth of India's IT industry, which is expected to employ 9m people in the next five years, almost triple current levels. Both the number of middle earners and their income levels are likely to rise rapidly, but their incomes will still be well below averages in the US and other rich countries.

Growth strategies in emerging markets over the next 15 years will have a familiar feel—broadly speaking, they will reflect the trends and strategies that are visible now in mature markets. Emerging markets will be going through known phases of development, as consumers become more demanding, segments consolidate and products proliferate. That

doesn't mean things will be easy, of course, but it does mean that the growth strategies currently being employed in more mature markets will be broadly applicable in up-and-coming markets for the foreseeable future.

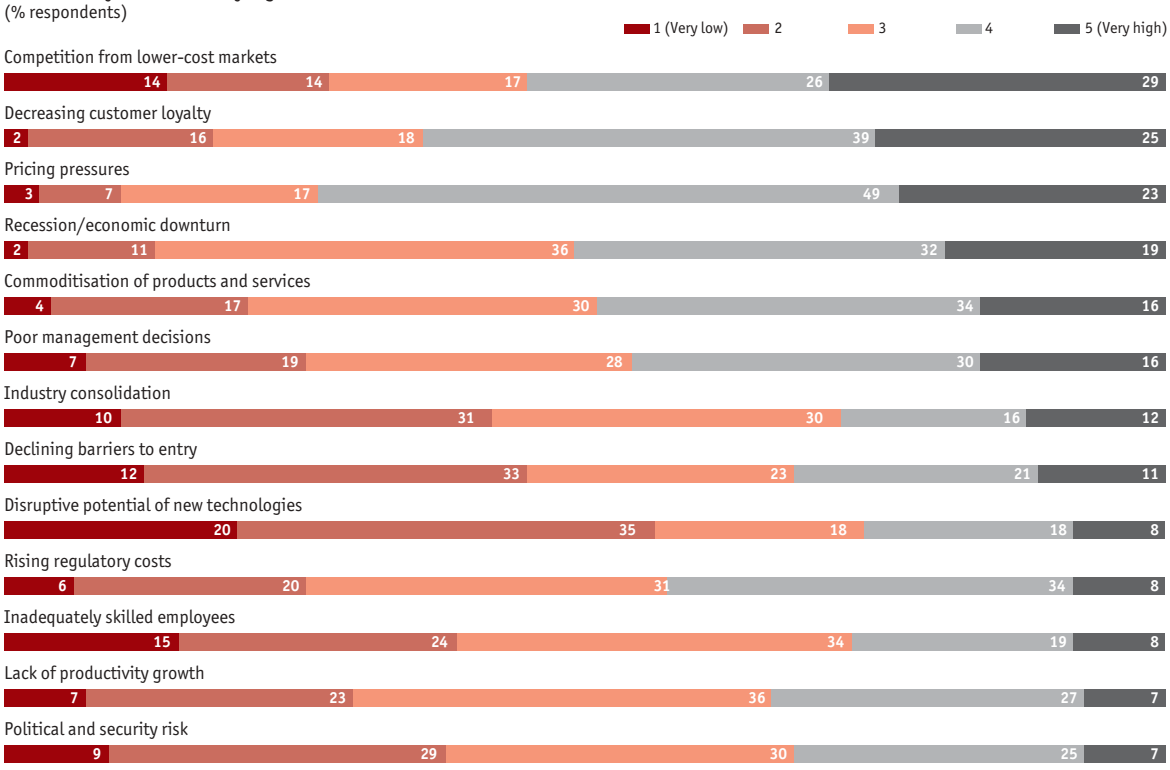
The challenge of maturity

Increasing sales in developed markets will be a much harder task than in developing markets. For most Western companies these markets are mature and consumer debt levels are already high. Competition from lower-cost markets will be increasingly ferocious—survey respondents see this as the greatest single risk they face over the next 15 years.

There will of course be new growth segments. Demographic change is seen by many as a source of opportunity. Greg Suthern, marketing and buying director of Dreams plc, a UK-based bed manufacturer and distributor, sees an opportunity to sell a variety of different bed types to elderly consumers, including more powered and adjustable beds that sell at higher margins than traditional beds. For the "do-it-yourself" market, an elderly population may mean one that buys more high-margin "do-it-for-me" services rather than low-margin "do-it-yourself" products.

The growth of ethnic sub-populations, whether through immigration or higher birth rates than the overall population, opens up other avenues of expansion. The US Census Bureau projects, for example, that Hispanics will account for 44% of US population growth over the course of the next 20 years. Expect many retailers and consumer goods

In your view, how threatening are the following risks to your company between now and 2020? Rate each risk on a scale of 1 to 5, where 1=very low and 5=very high.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, consumer goods and retailing respondents.

firms to target these fast-growing segments in their marketing and product mix.

For every retailer that thinks ageing populations are an opportunity, however, another sees them as a threat. Ageing populations will definitely necessitate difficult structural adjustments for companies that have built their businesses around younger customers, such as fast-food chains and mortgage brokers.

Where next?

In general, the strategies that retailers and consumer goods firms are employing now in developed markets will yield diminishing returns over the next 15 years. The benefits of further consolidation will reduce. Cost control, sourcing, outsourcing and offshoring will not be differentiators but costs of entry. And multi-channel marketing will increase the risk of channel conflict.

Consolidation has historically yielded economies of scale, but many industries are already or will soon be so highly concentrated that incremental accretion will not provide enough benefits to justify the investment. In some segments, regulatory barriers will also prevent further consolidation.

In this most competitive of industries, **cost efficiency** will still be critical—retailers and consumer goods firms see greater price pressures over the next 15 years than survey respondents from other industries. There are still significant opportunities to be exploited from sourcing, outsourcing and offshoring: retailers and consumer goods firms will continue to search for the efficiencies that come from low-cost country sourcing.

But cost control will become a given, not a differentiator. Although cost-control strategies will still present a significant opportunity over the next five years, the nearly universal focus on them will ensure that cost management will not be a major source of differentiated advantage in the long term.

Multi-channel marketing will experience growth as companies' Internet presence becomes more commonplace and customer relationship management technologies make direct mail more effective. However, market saturation, channel conflict and margin compression will converge to limit its potential in the long term.

US business has run into an efficiency frontier, says Bruce Crain, senior vice-president of Blyth Inc, a US$1.6bn US designer and marketer of home decorative and fragranced products. "You reach a point where it is difficult to take any more…cost out." Dell has already reduced its inventory to the point where it operates on negative working capital, for example. But if strategies based on efficiency are not suited to long-term competitive advantage, which are?

The importance of the sizzle

Branding is one answer. Retailers and CPG companies are more concerned about decreasing loyalty than other sectors: 64% consider this to be an important or very important threat, compared to 50% of respondents from other industries, which explains why a majority see brand strength becoming a more important source of competitive advantage over the next 15 years.

Many retailers will pursue brand extension strategies to drive home this advantage. Home Depot is piloting a format that involves adjacent gas stations and convenience stores. Other retailers will sell more services such as insurance or paralegal services and offer store-within-a-store deals to CPG manufacturers and service providers.

But retailers and CPG companies are also starting to define a new dimension for generating competitive advantage in their core markets: focusing on intimate relationships with customers and suppliers. Three-quarters of retailing and CPG survey respondents think that high-quality relationships with outsiders are a strong source of competitive advantage today, and an almost equal number (69%) think that improved

Europe: Complacency or confidence?

Survey respondents in the European retailing and consumer goods industries expect change to be more incremental than their counterparts in other regions. Europeans are much less concerned about commoditisation—only 34% of Europeans rate it as a significant threat, compared to one-half of overall respondents—and expect less price pressure than others. They are also less concerned about a recession, less concerned about rising regulatory pressures, and less concerned with disruptive technologies than Asian or American respondents.

Why the relative insouciance? Cultural and regulatory differences between countries create higher barriers to entry, for one thing. Brands also appear to offer more protection: almost two-thirds of European retailers say that brand strength is one of their top three sources of competitive advantage, compared to 52% in other regions.

Europe has a ready pool of skilled talent owing to its good schooling and relatively high historic unemployment rates. Only 10% of Europeans express concern about the adequacy of their companies' IT skills, compared to 21% of respondents in other regions.

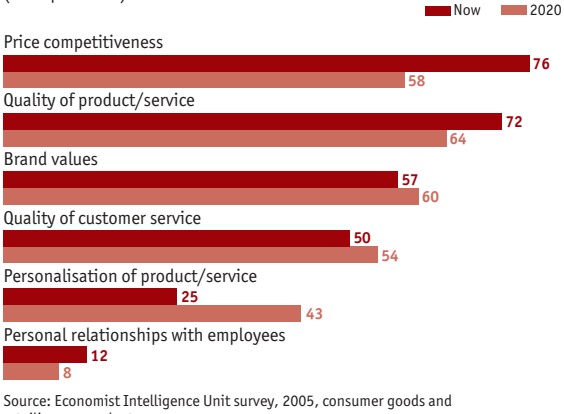
Eastern Europe and Russia also offer expansion opportunities right in Europe's backyard, compared to US retailers that have to cross oceans to penetrate new markets. Two-thirds of Europeans agreed that Russia will be one of the key countries in their global strategy by 2020.

collaboration inside and outside the organisation will be a critical success factor over the next 15 years.

"The reduction in the number of warehouses reaches a level where it doesn't add much value", observes Mr Crain. "At some point you have to go beyond price", he says, pointing to the importance of service quality, not just product quality. "Price cannot rule by itself."

At the retail level, this will manifest itself in differentiated shopping experiences and in increased customer intimacy. Stores and in-store service will be engineered to connect with the customer through personalised customer service, attractive and easy-to-navigate store layout, and specialisation of assortment.

Which of the following is most important to your customers now, and which will be most important in 2020?
Select up to three items.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, consumer goods and retailing respondents.

Mike Gotfredson, CEO of Road Runner Sports, talks about the magic moment with the customer when the company has the chance to sell, upsell, and above all make the customer feel good about his or her purchase decision. Road Runner Sports already analyses the results of promotions from direct mail campaigns and feeds the information back to consumer goods manufacturers. In the future, customer relationship management will become more commonplace and sophisticated as retailers and CPG companies improve their data analysis and capture skills.

The moment of product or service delivery will be increasingly managed, monitored and measured. Dreams plc leaves fragranced sachets on its newly delivered beds, like a hotel leaves mints for its guests. Of all of the areas of the business, the delivery especially must not be commoditised, warns Mr Suthern.

Retailers will need to replicate the same magic with suppliers as they do with customers. Retailers will need to "make the supplier buy into the whole mission of the company, not just take an order for beds", according to Mr Suthern.

A large majority of survey respondents say they will

involve their suppliers more in new product development processes—nearly 20% more than the aggregate response across all industries. And 69% expect to share more information with suppliers, compared to 52% on average.

A new type of employee

Relationships, knowledge management and creativity will be essential to gaining and sustaining competitive advantage in core markets over the next 15 years. "Give me creativity over efficiency any day", quips Peter Brown, CEO of Flair Leisure Products, a toy company. Management and interpersonal skills will be the first and second most important skill sets over the next 15 years, according to 73% and 45% of survey respondents, respectively.

The transition to a workforce equipped with these kinds of skills will be challenging. "Creativity is hard; it's easy to find people who can do the books", says Mark Miranda, director of marketing at Georgia Pacific, a manufacturer and distributor of tissue, paper and packaging.

Among the concrete steps that companies can take are more systematic monitoring and measuring of creativity and innovation through service audits; investment in business intelligence tools that help develop customer-specific sales and servicing strategies; and changes to recognition and compensation systems that reward creativity and customer service.

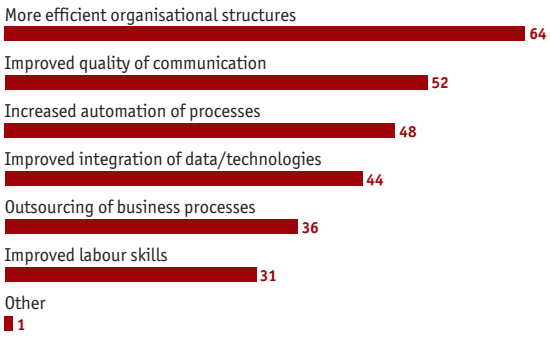
IT investment will shift away from cost or efficiency-based applications to reflect the importance of higher-value interactions and of an improved customer experience. Survey respondents expect their IT investment between now and 2020 to focus first and foremost on customer service and support, rather than on financial management and general IT infrastructure, as is the case now.

Human resources management and training, as companies develop training programmes "off-line" and then deliver them online and remotely through software applications, will also rise in importance. Training will be crucial, and will in many cases be done by professional training companies, says Tony Joyce, Dunhill's worldwide director of retail and licensing.

Knowledge management will be another key area of investment. To gain a competitive advantage through creativity, innovation and intimacy, retailers and CPG companies will need to retain, archive, manipulate and share data effectively. Survey respondents in the industry believe that more efficient organisational structures and better communication will be their primary sources of productivity gains, well ahead of increased process automation.

Collaboration and project-management tools will become more important as people work more closely across functional and organisational barriers. With a continuing decrease in product lifecycles and tighter relationships between buyers and suppliers, retailers will need to co-ordinate the launch of new products and product extensions more closely, and manufacturers will need to collaborate on new product development time-frames and milestones with their suppliers.

Where will your organisation focus as it seeks to improve productivity growth over the next 15 years?
Select up to three options.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, consumer goods and retailing respondents.

Foresight 2020: Energy at a glance

The global marketplace: Rising growth in energy demand, fuelled by consumption in developing countries, allied to concerns over security of supply will create a backdrop of high and volatile energy prices over the next 15 years. Large increases in market size are unlikely at the distribution end of the industry in developed countries.

Products and services: Exploration and production activities will increasingly focus on harder-to-extract energy resources. Oil's share of total energy demand in 2020 will drop slightly but alternative energy will account for only a very small proportion of projected energy consumption in 2020.

The industry landscape: The energy sector will remain highly susceptible to government intervention, given price volatility and supply concerns. Increasing competition between energy suppliers will be a feature of most markets, forcing distributors to seek out new ways of differentiating themselves.

Changing relationships: The prospect of distributed power—power generated at a local level, rather than centrally—will encourage the idea of customers as energy managers rather than consumers. Competitive advantage for distributors will increasingly depend on the provision of personalised energy solutions and advice.

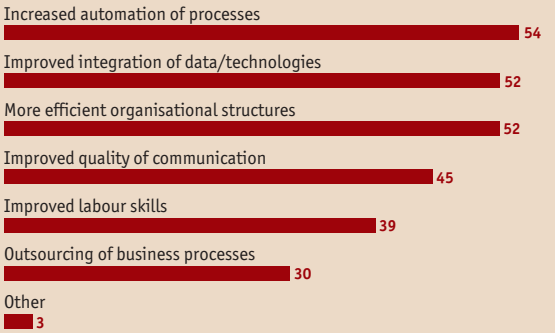
Corporate strategies: Different firms within the energy ecosystem have very different goals and interests. Exploration and production firms will seek gradually to diversify into alternative energy sources. An increasing emphasis on solutions will lead energy distributors to improve servicing and maintenance packages and to extend into adjacent areas such as financing.

99 respondents from the energy sector took the survey. More than two-thirds came from large companies, and almost one-third were board-level executives.

Key survey data

Increased process automation, more efficient organisational structures, and better integration of data and technology are expected to be the major sources of productivity gains in the energy industry.

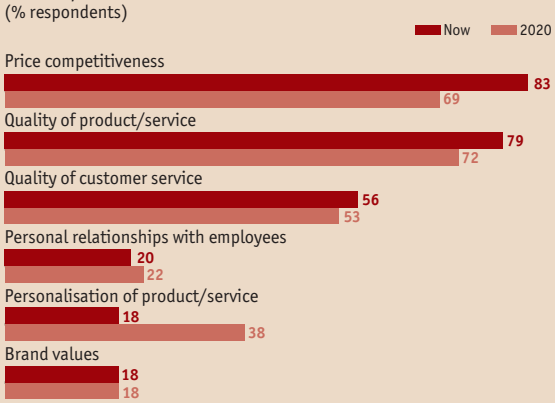
Where will your organisation focus as it seeks to improve productivity growth over the next 15 years? Select up to three options.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, energy respondents.

Price and quality are expected to remain the most important factors for customers, although product and service personalisation will grow in importance.

Which of the following is most important to your customers now, and which will be most important in 2020?
Select up to three items.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, energy respondents.

History is littered with the wrecks of failed energy forecasts. Many factors make predicting future production levels very difficult, from political instability to uncertainty over existing reserves. But recent forecast failures have also stemmed from miscalculations on the demand side of the equation. Very rapid growth in energy consumption, notably in China, has caught both markets and forecasters by surprise. The continued outpacing of supply growth by demand growth, driven largely by rapid economic development in emerging markets, will provide the industry backdrop over the next 15 years.

Growth in developing countries will push their share of world oil demand up from an estimated 33% in 2004 to 41% by 2020, according to the International Energy Agency (IEA). China's share of world oil demand alone is expected to jump from 7.6% in 2004 to almost 11% by 2020.

The developed world will still consume more energy than developing countries in absolute terms but its share of world demand will fall. The OECD will also still account for more natural gas consumption in 2020—even though the volumes consumed by the developing world are expected almost to treble over the forecast period.

World oil demand

	2004		2020	
	m b/d*	% of total	m b/d	% of total
North America	24.9	30.3	29.1	27.7
OECD Europe	14.5	17.7	15.4	14.7
OECD Asia	8.3	10.1	8.7	8.3
Russia	2.6	3.2	3.3	3.1
China	6.2	7.6	11.2	10.7
India	2.6	3.2	4.3	4.1
Other Asia	5.4	6.6	8.3	7.9
Latin America	4.7	5.7	6.5	6.2
Africa	2.6	3.2	4.5	4.3
Middle East	5.4	6.6	8.1	7.7
Oil bunkers	3.1	3.8	3.2	3.1
Total world	**82.1**	**100.0**	**104.9**	**100.0**
of which				
OECD	47.6	58.0	53.2	50.7
Transition economies	4.4	5.4	5.6	5.3
Developing world	27.0	32.9	42.9	40.9

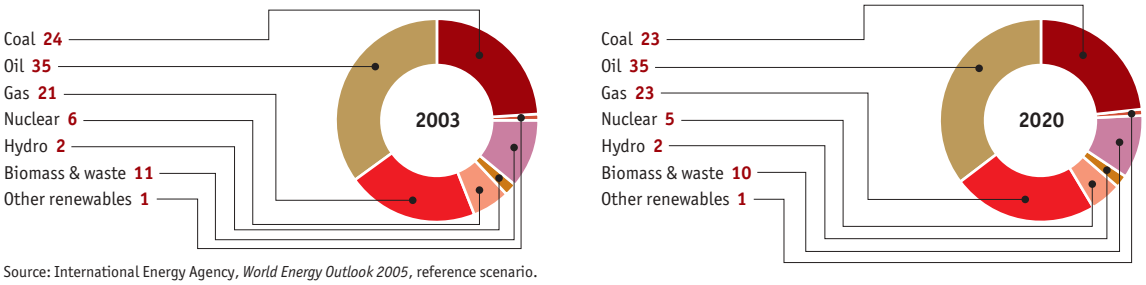
Source: International Energy Agency. *million barrels per day.

Forecasts of the date of any oil production peak, or when oil supplies will run out completely, diverge widely. The optimists think a production peak is not likely until the 2030s; the pessimists think that a decline could start much earlier. In the meantime, increases in supply can be achieved in three ways: first, by developing new hydrocarbons reserves; second, by extracting more from existing reserves; and, third, by increasing the share of alternative energy sources in overall supply.

The current consensus is that massive new hydrocarbons reserves are unlikely to be discovered, although quite a few smaller new resources, most of them in the Middle East and Latin America, could be brought onstream, especially as high prices enable greater investment in exploration and production. Significant strides have already been made on the second track: technological advances have increased recovery rates from existing resources. Come what may, energy companies will have to work that much harder to get resources out of the ground. Offshore and deepwater exploration will become more common, and messier oil sources, such as bitumen-rich oil sands, will be the focus of greater attention.

As regards alternative energy sources, technological advances, environmental pressures, issues of security of supply and high oil prices are driving rapid progress. Wind generation now provides a substantial (if unpredictable) contribution to electricity supply in some areas; tidal generation is an alternative and less erratic option. By some estimates, the cost of producing electricity from solar panels is not far above the real peak cost of power from some countries' electricity grids. Fuel cells continue to make technological advances, and clean coal technologies

Energy demand projections
(% share)



Source: International Energy Agency, *World Energy Outlook 2005*, reference scenario.

are being developed to reduce carbon dioxide emissions from the world's most abundant fossil fuel.

But even the most enthusiastic proponents of alternative technologies concede that they will be able to meet only a small share of total energy demand by 2020, not least because of the enormous advantages of fossil fuels for transport uses.

The extent to which governments will intervene to push renewable energy sources is likely to depend more on security concerns than climate change. As Wim Thomas, head of the energy analysis team at Shell points out, national governments will push use of renewables hardest in a world where globalisation stalls and national interests come to the fore. As long as markets remain open and security of supply is less threatened, slower-acting market mechanisms such as emissions trading will be the primary vehicles for developing alternative energy sources.

The certainty of volatility

The market outlook to 2020 is therefore for high but volatile energy prices. The IEA thinks that oil prices will remain high in real terms through to 2020. In nominal terms, it forecasts that the average annual price of IEA oil imports will increase from US$36/barrel in 2004 to US$50/b in 2020. Other hydrocarbons energy prices, with the possible exception of coal, are likely to follow the oil price lead.

High prices are one source of concern. Security of supply is another. The current geographical disconnect between the world's oil producing and consuming nations will worsen as China's consumption levels rise and the importance of the Middle East as a production centre grows. More oil will be in the hands of national oil companies as opposed to independent oil firms.

As a result the energy sector will remain highly susceptible to government intervention. Over 55% of energy industry respondents to the Foresight 2020 survey regard political and security risk as posing a "high" or "very high" threat to their business between now and 2020; this compares with a share of just 40% for survey respondents overall.

Such risk comes in a variety of guises. At its most drastic, it entails the threat of military action to secure supply. Less dramatically, price-management machinations among producing nations will continue: an OPEC-type organisation for gas producers is quite possible.

Governments will also use economic policy

Energy price projections
(real terms, in mid-2004 US$, unless otherwise indicated)

	2003	2020
IEA oil imports (US$/b)	36	37
IEA oil imports (US$/b,nominal terms)	36	50
US natural gas imports (US$/mBTU)	5.7	5.9
European natural gas imports (US$/mBTU)	4.2	5.2
Japanese LNG imports (US$/mBTU)	5.2	6.1
OECD steam coal imports (US$/tonne)	55	50

Source: International Energy Agency, *World Energy Outlook 2005*, reference scenario.

Nuclear power: White knight?

Combining the stabilisation of carbon dioxide emissions with continued economic growth implies a more efficient use of fuels, a different mix of existing technologies and the greater use of new technologies. But there is one energy source that could help matters considerably. The technology underpinning it is well researched and tested. Power plants using this energy source are numerous and create negligible carbon emissions.

The energy source is, of course, nuclear fission. Environmental concerns and plant failures tainted its reputation in the 1980s and 1990s, although by no means everywhere—France generates most of its electricity via nuclear plants. But the need to square increasing power output with stable carbon emission concentrations means that nuclear is now getting a second look.

In the longer term, other benefits from nuclear are possible. New reactor designs could create hydrogen as a by-product, providing an alternative source of energy for the transport sector. Further down the line, nuclear fusion (if ever realisable) offers the extraordinary prospect of no-pollution, low-radiation, safe power.

Even so, the International Energy Agency forecasts a drop in nuclear power's share of world energy output by 2020. Public antipathy in many markets is one reason. The long lead times necessary to agree to build nuclear power stations and concerns over nuclear waste disposal are others. But Dr Katherine Blundell of Oxford University is among those who believe that if you want a major additional source of energy by 2020, "you have to get serious about nuclear fission—and you have to get serious soon".

responses to manage price and supply volatility. Energy price caps are one option, but these are difficult to apply or sustain, especially in market-driven economies. More subtle market distortions are likely to result from the increased use of energy-related subsidies or tax breaks. These could be extended to protect groups in society (such as the burgeoning numbers of elderly people) that are particularly affected by higher prices.

In response, one trend is towards vertical integration, whereby distribution companies, for example, buy into energy extractors, thereby creating a hedge against future supply disruption. Other approaches to vertical integration could include the conclusion of long-term supply agreements with producers, guaranteeing certain volumes of energy supply, even if the price cannot be fixed.

Another approach, already commonplace, is diversification, through investment in the development of alternative energy sources. Firms will look at a number of new technologies, some of which will work, and some of which won't. "There is no silver bullet here", warns Mark Henstridge, head of macroeconomics at BP, which has a profitable solar cell business and is developing wind farms at existing BP refineries and petrochemicals plants. The vast majority (88%) of survey respondents agree that environmental issues will be a major driver of corporate strategy.

The customer takes charge

The prospect of distributed power—power generated at a local level, rather than centrally—will ask even more questions of today's energy firms. By 2020, says Bill Gross, head of Energy Innovations, an alternative energy firm with a focus on solar power, "the big trend will be towards distributed power. People will want to take more charge of power."

The traditional model for stationary power supply (as opposed to vehicle power) hinges around the concept that "big is best". For a conventional thermal power network, that is undoubtedly true. But with many forms of alternative power, the gains from scale are minimal. Separate arrays of solar panels are as efficient as large concentrations; massive fuel cells are not an option, nor would they be desirable.

Local networks are already a reality for heat provision in Scandinavian networks and elsewhere; commercial firms such as Germany's Bosch-Buderus are currently developing domestic Combined Heat and

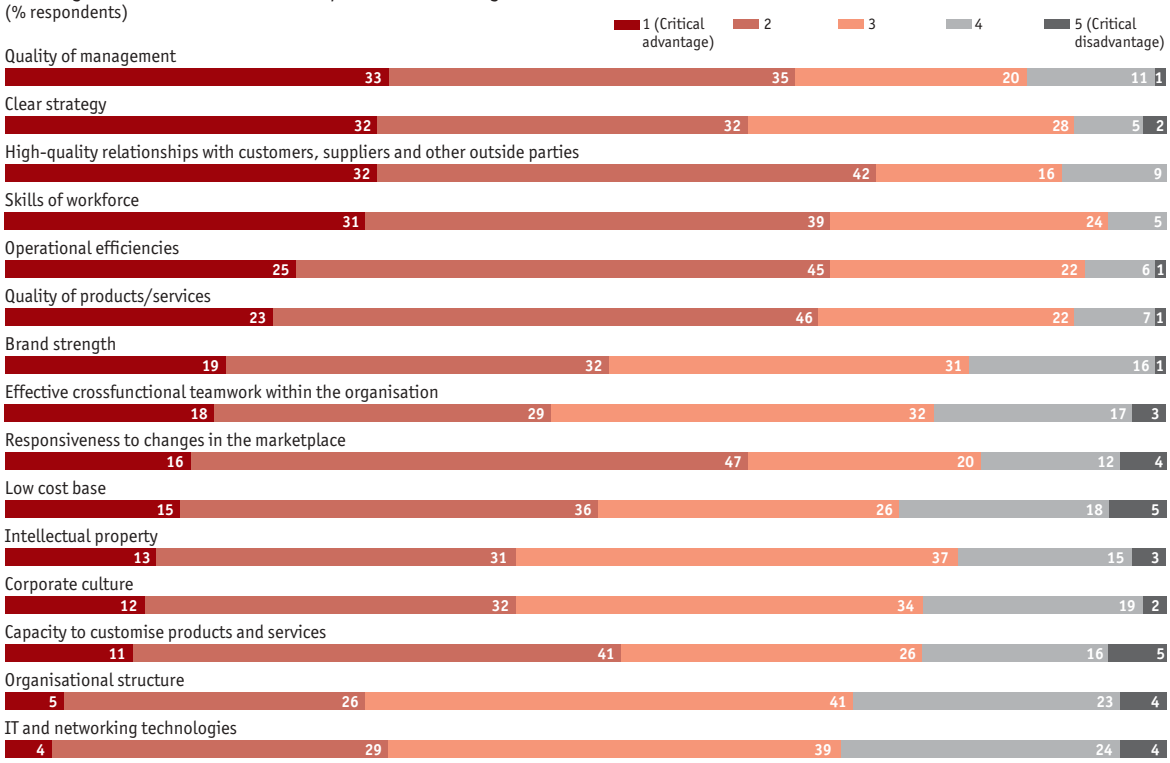
Power (CHP) systems using fuel cells. As Mr Gross points out, the mathematics for CHP systems are beginning to look interesting. Even if you generate electricity itself relatively inefficiently at a local level, you may be able to use the heat by-product, so boosting overall energy efficiency to satisfactory levels.

Distributed power may also allow developing countries partly to bypass traditional energy infrastructure, just as mobile phones allowed some to avoid installing or upgrading expensive fixed-line networks. For developed countries too, greater local production could reduce the required size of the main electricity distribution grid. As David Nunn, a senior vice-president of Norsk Hydro, puts it, "if you can do things to reduce necessary capacity, this will increase competitive advantage".

Technological advances are too easily hyped. Progress may be slow. Alternative energy firms themselves are amongst those urging caution. John Halfpenny, CEO of CMR Fuel Cells, thinks that it will take time for people to switch, and that conventional heating technology has room for further improvements.

But even if distributed networks take time to develop and account for only a small amount of energy consumption in 2020, as seems likely, their significance will lie in the threat of change. The seed of a new idea will have been sown: the customer as energy supplier or at least energy manager, not helpless consumer. It is to the changing relationship between firms and their customers that we now turn.

Where do your sources of competitive advantage currently lie? Rate each on a scale of 1 to 5, where 1=critical source of competitive advantage and 5=critical source of competitive disadvantage.
(% respondents)



Source: Economist Intelligemce Unit survey, 2005, energy respondents.

Europe: Much to do

The EU is still some way off a single market in energy. Most countries have their own independent energy regulators; varying tax levels also mean that the cost of energy sold to the consumer varies widely from country to country. Regulatory costs are of greater concern to European energy survey respondents than energy respondents overall. Wholesale trade in energy between countries is complicated by infrastructural failings—most obviously in an inadequate natural gas pipeline network.

The EU still plans to have full competition in energy household provision by 2007. But last year it had to refer several countries to the European Court of Justice for not implementing 2003 energy directives. And in 2005 the European Commission launched a major enquiry into anti-competitive practices in the energy industry.

One particular worry is that progress towards integration will be negated by an increasing concentration of power within individual countries' energy sectors. The prospect of sustained high prices may encourage national governments to build up "national champions", and to halt the "unbundling" of existing dominant suppliers or distributors.

Securing competitive advantage to 2020

Increasing competition between energy distributors will be a feature of most markets over the next 15 years. Energy respondents to the survey emphasise operating efficiencies and a low cost base in response. Firms are also trying to encourage product differentiation, claiming, for example, that advanced (and more expensive) petrol gives you better performance or fuel economy. But this approach has obvious limits. It is difficult to attach particularly desirable marketing qualities to a kilowatt of electricity cabled into your house, or to natural gas.

So the hunt is on for other ways to boost customer loyalty. Some are cruder than others. One approach is to increase the number of different utilities that a consumer takes from you: one study by a European energy supplier confirmed that customers who took telephone services from an energy supplier were much less likely to shift their energy accounts elsewhere.

Other techniques are more subtle. In an idiosyncrasy of the energy industry, customer loyalty can also be achieved by encouraging less consumption, not more. Energy suppliers in developed markets realise that for environmental and economic reasons, this is not a sector where large and sustained increases in market size (if not market share) are possible. As Mark Clare, deputy chief executive of Centrica and managing director of British Gas puts it, "that's a dead duck going forward".

British Gas puts great emphasis on the ways that it can help consumers to reduce energy consumption, offering advice on energy conservation. For suppliers with a leading position in individual country markets, this may also have the desirable side-effect of discouraging governments from butting in.

Danny Hann, head of strategic planning management at a British power firm, RWE npower, agrees that supply firms must move "towards establishing a broader-based relationship with the customer, a relationship based on broad energy solutions, not just a supply deal and a bun-fight over pence per kwh".

Mr Hann suggests that npower can advise corporate customers about managing data, energy efficiency, their carbon impact, and existing regulation and legislation to create a solution based on their own preferences—in his words, "how they see the world, not how we do". Mr Hann's belief is that firms must provide a variety of solutions to consumers based on their individual preferences, whether these are for the cheapest solution or the most energy-efficient one.

The survey results reinforce his analysis. Only 18% of energy industry executives cite "personalisation of products and services" as a top customer priority today. But executives expect rapid change: 38% believe personalisation will be a top customer priority by 2020.

This emphasis on solutions will lead energy suppliers to improve servicing and maintenance packages and to extend into adjacent areas, such as financing instalments of new energy systems or offering insurance against cuts in energy supply. Firms in other sectors, for example automotive, have found that arranging finance can be as, if not more, profitable than product sales themselves. Expect more energy firms to follow suit.

Old industry, new skills

The energy market to 2020 will contain an unsettling combination of price liberalisation and increasingly brutal competition at the retail end of the market, and heavy and possibly increasing state involvement at the production end. No wonder that survey respondents expect a clear strategy to be a critical source of competitive advantage.

Of course, different parts of the industry will continue to have different imperatives. Energy firms will place a greater emphasis on project-management and risk-management skills in their exploration activities than their distribution ones. But by 2020 the emergence of distributed power will arguably have started to collapse the very distinction between upstream and downstream.

Increasingly complex interactions with customers will be necessary in a market environment characterised by price volatility, deregulation, commoditisation and local power generation. Survey respondents in the industry identify a lack of employees with interpersonal skills as the most significant barrier they face to improved relationships with external parties; most plan to improve performance through strategic deployment of IT resources—in knowledge management and customer support, among other areas—and through training and recruitment.

Foresight 2020: Financial services at a glance

The global marketplace: Growth prospects for the industry are very good. Under-served but fast-growing developing nations will see higher demand for basic services, and mature Western markets will find growth focused on higher-end products.

Products and services: Banks, insurers and fund managers will be under pressure to offer an increasingly sophisticated range of products, some of which are currently the province of specialised industry segments. The growing complexity of investment products will drive demand for personal advice.

The industry landscape: Distribution strategies will differentiate institutions more than products. Some institutions will position themselves mainly as low-cost providers of utility services, whereas others will emphasise sophisticated investment offerings. Still others will function like financial supermarkets.

Changing relationships: Although financial advice will be costly to offer and to buy, it is also where the industry's growth lies in developed countries, as a flood of liquidity looks for investment opportunities. As customers wield greater control and choice, employee profiles will emphasise flexibility and customer-facing skills rather than product expertise.

Corporate strategies: Most financial institutions will still live or die by how well they manage costs in the commoditised end of their businesses. Those with the most sophisticated technology platforms, the most streamlined business processes and the best control of outsourced services are likely to gain the upper hand.

263 executives from the financial services sector took the survey. Almost two-thirds came from large companies, and a majority were board-level executives.

Key survey data

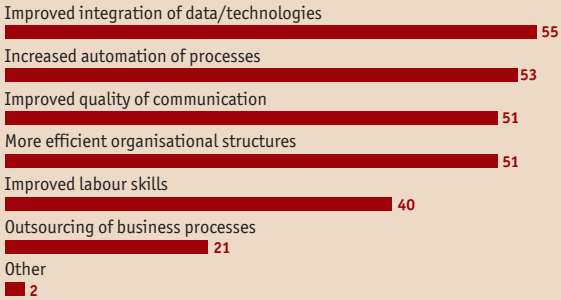
Management skills, risk-management skills and interpersonal skills will be most important to organisational success between now and 2020.

Which skills will be most important to your organisation's success over the next 15 years? Select up to three options.
(% respondents)

Source: Economist Intelligence Unit survey, 2005, financial services respondents.

Technology-enabled change—including data integration and process automation—will be critical to future productivity gains.

Where will your organisation focus as it seeks to improve productivity growth over the next 15 years?
Select up to three options.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, financial services respondents.

Like the archetypal banker in a dark three-piece suit, the financial services industry likes to project stability and prudence. More than other industries, financial services depends on trust—on the public's belief that a dollar saved or invested today will be there when required tomorrow. It comes as no surprise, then, that financial executives contemplating the future emphasise gradualism. Anything more dramatic could shake the trust that underpins the system.

Yet the changes may be radical indeed. The lines that now divide banking, insurance, fund management and other industry sub-sectors will blur, forcing financial institutions to find new ways of differentiating themselves. There will be a sharper divide between companies offering utility-type transaction services and those offering high-end investment and risk-management products. Technology will be paramount but success in higher-end products will increasingly depend on a humanisation strategy that combines high tech with high touch. The industry will be more global and more consolidated, but many customer segments will also demand a local presence.

Different regions, different growth paths

The industry as a whole will expand in size and importance by 2020, as economic development fuels demand for basic transaction services in developing countries, and as wealth accumulation drives up demand for investment products in richer countries. According to Mercer Oliver Wyman, a consultancy, financial services will grow from 6% of global GDP in 2005 to 10% in 2020, reaching annual revenue of US$6trn. Further technological developments, such as sophisticated point-of-sale payment devices and data search and storage engines for insurance underwriting, will further boost the industry's growth, as well as changing its competitive landscape.

Asia's importance will rise greatly over the next 15 years. "The growth potential is greater in Asia, especially in China and India", says Willie Watt, CEO of Martin Currie Investment Management in Edinburgh. "Those countries are very undersupplied with financial services such as banking and investment products, and that is where the best long-term growth prospects lie." A majority of survey respondents from the financial services industry expect non-OECD markets to be their major source of growth over the next 15 years.

A corollary is the likely emergence of global financial centres in Asia. "In the Far East there is no dominant centre but there are some strong contenders, including Singapore, Hong Kong and Shanghai", says David Lascelles of the Centre for the Study of Financial Innovation. "Shanghai may well be a leading centre in 2020. It is fairly innovative and has an open-minded atmosphere."

Although on a percentage basis economic growth in the mature markets is slower than in developing countries, these markets will continue to see the largest demand for financial services, thanks largely to demographics. A mid-2005 study by Allianz Global Investors predicts that west European pension markets will more than double in the next decade, from €7.4trn to €16.4trn in 2015.

The search for a global brand and global strategy will be increasingly important as financial markets expand across borders. As trade in services liberalises, and as developing countries demand more financial services, economies of scale will increasingly determine competitive advantage. For example, banks that set up globalised central processing facilities for back-office work will see per-unit processing costs decline as volume increases.

Some experts predict a wave of consolidation that will leave only a few global giants dominating the industry. "I see the development of perhaps a handful of powerhouses, who will dominate the global marketplace", says Gregor Bailar, chief information officer of Capital One. Asian banks may well be among them. "Until now the discussion has been about which

Europe pulls itself together

If global integration of financial markets is likely, in the EU it is already happening, at least in theory. The European Commission's Financial Services Action Plan (FSAP) is a series of 42 legislative measures aimed at pulling together financial markets in the 25-nation bloc by introducing common standards and regulatory principles. Retail markets are still fragmented, however, despite the FSAP's 2010 deadline, and it may be 2020 before the EU market is integrated enough to feature direct, crossborder provision of services.

Crossborder mergers will be a quicker route to international expansion. "Greenfield pan-European financial institutions are seldom successful", says Freddy van den Spiegel of Fortis Bank. "For the bulk of consolidation, banks need to acquire established banks if they want to operate in another country. There is still a stable underlying relationship between banks and their customers, and I don't see that changing."

"I don't see dramatic change happening in the euro zone, but I do see a steady coming together of those markets in that time period," says David Lascelles of the Centre for the Study of Financial Innovation. "Cross-border consolidation of banks can be very fraught in the EU and will be slow to happen. But the use of the single currency will encourage integration."

The implication of greater integration is a more diversified supply of financial services, says Mr van den Spiegel: "If integration is successful and there is a pan-European market, that offers financial institutions the advantage of economies of scale. It will also allow banks to find specialised niches for different types of customers. Some might aim for pure discount customers and offer simple products at low cost, but will do so on a European scale."

Asian banks might be acquired by European and US banks", says Freddy van den Spiegel, chief economist of Fortis Bank. "In ten years' time, the discussion could be the other way around."

The price of entry

The customer of 2020 will want much the same things as customers do today. Those looking for basic transaction services such as current accounts and no-frills insurance policies will search, as they do today, for providers with a good product selection at good prices, backed up with user-friendly distribution channels and responsive customer service. Customers with assets to invest will search for objective and well-informed advice, backed by efficient back-office processing.

However, the bar for product design, technology and customer service in all these products will be raised, as more sophisticated shoppers use the Internet to find more sophisticated providers. The same goes for companies, who will have a growing array of products and providers to choose from in corporate and investment banking, and an increasing tendency to tap capital markets outside their home bases.

Although much of the growth in the developed world will be in high-end products, banks and insurers will still live or die by how well they manage costs in the commoditised end of their businesses. Excellence in the basic-services side of the business will be a precondition for competing successfully at the higher end of the market. "Customers will expect more efficiency, in part because the technology is available, and in part because they have become used to user-friendly and transparent systems in other industries, such as airlines", says Dick Harryvan, general manager of ING Direct.

Those with the most sophisticated technology platforms, the most streamlined business processes and the best control of outsourced services are likely to gain the upper hand. "The main source of competitive advantage in 2020 will be cost control, productive efficiency in the back office, and commercial efficiency", says Alejandra Kindelan, chief economist of Grupo Santander, the world's tenth largest bank and the euro zone's largest.

Well-run utility-type products such as current accounts and payment services depend heavily on strong, integrated IT platforms. Grupo Santander,

which has a presence in 40 countries, recently put this principle into practice by integrating the IT platform of its newly acquired UK subsidiary Abbey into the central IT platform in Madrid. "We showed that synergies in banking are not only obtained by closing branches, but also by having a good combined IT platform", says Ms Kindelan. "That allows you to grow your business without growing the back office in the same proportion."

Many in the industry share her view. In the Economist Intelligence Unit's online survey, financial executives said they expect their companies to focus on improved integration of data/technologies (55%) and increased automation of processes (53%) as they seek to improve productivity over the next 15 years.

Finding a niche

Doing the basics well is a pre-requisite for success. But it is not always enough to differentiate one institution from another, especially as competitive pressures increase. At the retail end of the market, retailers, stock brokerages and fund management companies are already competing with banks as providers of wealth-management products. Reinsurers face the prospect of competition from investment banks. "Anyone—not just insurance companies—can float a bond to underwrite major risks", says Robert Hartwig, chief economist of the Insurance Information institute in New York. Private equity firms compete not just with each other, but increasingly with hedge funds and investment banks, in buyout auctions.

To distinguish themselves further in a world of blurring industry divisions, financial companies will have to choose a strategy based on competitive strength. In most segments of the industry, competitive advantage in 2020 will not come from the products themselves, since products are easily copied, says Mr Harryvan of ING Direct. "The competitive edge will come from the distribution strategy, and from how you position yourself in terms of brand and customer segments."

Some will position themselves mainly as low-cost providers of utility services, whereas others will emphasise sophisticated investment offerings. Still others will function like financial supermarkets, predicts Mr van den Spiegel of Fortis Bank. "There is more and more incentive for banks to open their distribution capacity to the products of other providers. Many banks already serve as distributors of credit card services provided by others. There is also the possibility of "white labelling"—re-branding another supplier's product with your own brand name. A bank may decide it should be a distributor, similar to Carrefour in retailing."

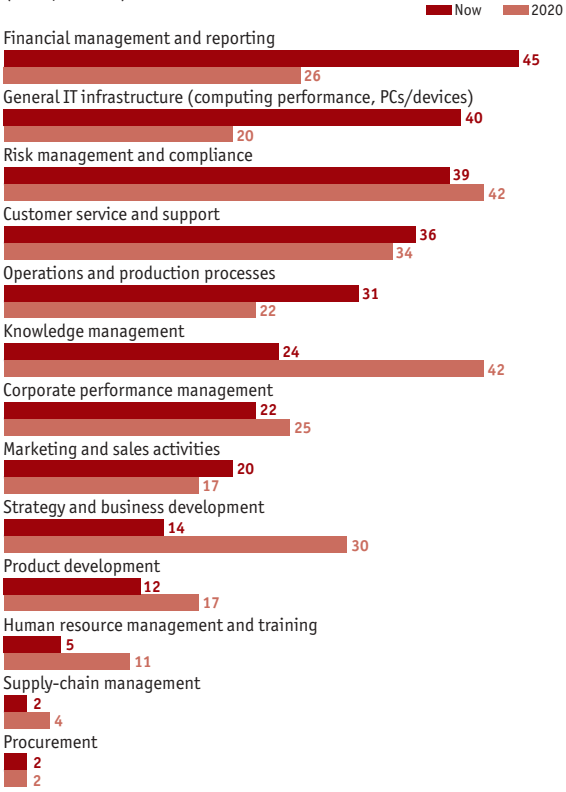
The technology edge

Cutting-edge technology, including the ability to offer the products of other suppliers through open-architecture IT platforms, will be decisive throughout the financial services market. Dr Hartwig of the Insurance Information Institute says industry players are engaged in a "technological arms race" that involves all aspects of their businesses.

In insurance, for example, technology innovation will change how institutions communicate with customers, underwrite policies and settle claims. Online communications can be used to analyse applications for insurance, assign a premium, calculate reserve requirements, and even judge claims, with satellites taking high-resolution photos of insured properties. "Data search and storage technology can be used to check up on what people say in applications for insurance", says Dr Hartwig. "If they say the property is not located near water, a satellite photo could show otherwise."

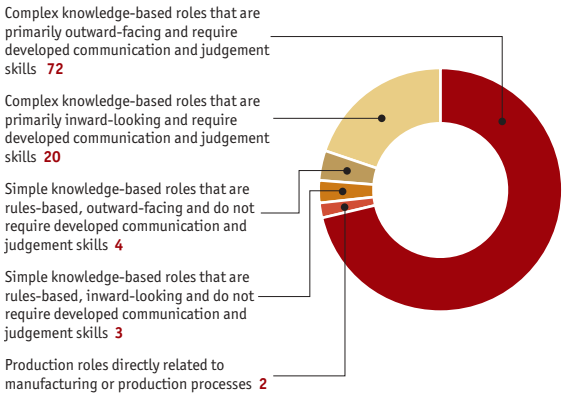
In banking, the competitive advantage will belong to companies able to offer services "anywhere, anytime", and not only over the Internet, says Mr Harryvan of ING Direct. "We have not seen the end of development of new devices that can be added to

What are the top three areas of focus for IT investment at your organisation now, and what will be the top three areas of focus over the next 15 years?
Select up to three activities.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, financial services respondents.

Which of the following types of role will be most valuable to your organisation as a source of competitive advantage in 2020?
(% respondents)



Source: Economist Intelligence Unit survey, 2005, financial services respondents.

Internet infrastructure. There will be a whole host of channels for delivery of banking services, for example personal digital assistants (PDAs), mobile telephones and television. Customers will be able to do their banking wherever they are."

Knowledge management and customer support technologies will also be a major source of competitive advantage. "Having good information about customers, so that the bank can offer the right product at the right time to different customers [is critical]", says Ms Kindelan. "Consumers will choose a financial services provider that knows what they want to do with their money, or a provider that can suggest appropriate investment or spending options, rather than just standing by as a mover of their money", agrees Mr Bailar at Capital One.

High tech and high touch

Technological advances do not mean that traditional face-to-face sale and delivery of financial services will disappear by 2020. On the contrary, although simpler products will be sought and used through Internet and other devices, the growing complexity of investment products will drive demand for personal advice.

"With mortgages, for example, customers would rather see a face", says Ms Kindelan. "These decisions involve a lot of money, and customers aren't likely to look for advice over the Internet." Nearly three-quarters of the survey respondents in the industry (72%) say that client-facing roles that rely heavily on judgement will be most valuable to the organisation's competitiveness in 2020.

Ageing populations will reinforce the trend toward more personalised service for high-end products, predicts Mr Harryvan of ING Direct: "You hear a lot about today's younger generation being very IT focused, going to websites to compare product offerings and the like. But 80% of assets are owned by

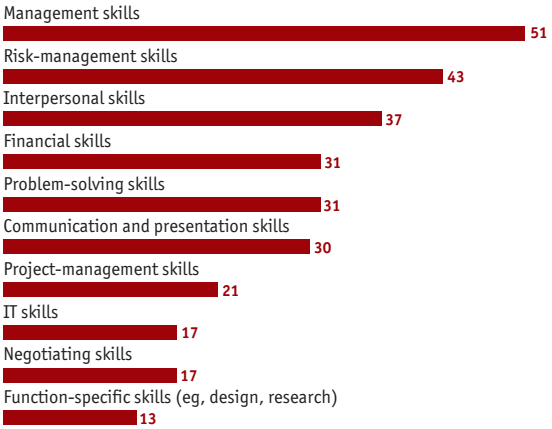
people older than 50. The fact that the younger generation is doing things online does not change the fact that the majority of assets in 2020 will still be held by older people."

The higher cost of delivering advisory services will lead to reductions in the range of work done in bank branches, however. "I think the branch system will stay, but branches will have more limited functions", says Mr Harryvan. "Branches in 2020 will mainly employ people offering financial advice. The question will be, how much will customers be willing to pay a bank to manage their money."

In the mature markets, banks and other financial institutions will find growing demand for advice on managing personal wealth outside of disappearing final-salary pension schemes, including helping individuals to invest funds under defined-contribution pensions. Such self-directed investments will, over time, greatly exceed the volume of investments managed under final-salary or defined-benefit pension schemes, particularly as pension funds gradually lose their tax-advantaged status owing to fiscal pressures.

"Individuals rather than organisations will make pension decisions", predicts Mr Watt of Martin Currie Investment Management. "There will be more savings outside of pension plans, and more funds in wealth management. This is where niche players in fund management will find growth markets."

Which skills will be most important to your organisation's success over the next 15 years? Select up to three options. (% respondents)



Source: Economist Intelligence Unit survey, 2005, financial services respondents.

The financial services employee of the future

What is the staff profile of tomorrow's financial institution? Given expectations both of higher-value interactions with customers at many institutions and of greater collaboration with other product providers, emphasis will shift toward flexibility, customer-facing skills and collaborative ability rather than product expertise. "We will need people who have superior judgment, who are professional and articulate", says Mr Watt. "Junior recruitment is about hiring for intellectual and interpersonal skills, leadership qualities, energy and drive. If you hire quality people at the bottom of the business, they will be the leaders in 15 years."

At Capital One, the emphasis has shifted toward hiring technology-oriented entrepreneurs. "We call it the future of work", says Mr Bailar: "We tend to attract people who want to use technology in new ways and work in an entrepreneurial environment."

Finding flexible employees who eschew hierarchies may not prove as difficult as it sounds. "If you look at young people today, you will see that they have this approach already", says Mr van den Spiegel of Fortis bank. "They do not like hierarchy, they want flexibility, they want the capacity to go from one job to another and to have their own areas of responsibility."

Along with a changed employee profile, financial services firms will change their organisational structures to emphasise flexible teams, industry experts say. The point of a team-based approach is agility: the ability to research new market segments faster, to develop new products more effectively and to respond to customer requests with the optimal mix of skills and services.

Capital One says this kind of structure already enables it to cut time-to-market for new products by an average of 40%. "We form teams to address potential new market niches", says Mr Bailar. "Each team consists of people with different areas of expertise, such as technology, operations, design and marketing. They work in open spaces, not private offices, and we encourage them to share ideas and innovate."

A model for such a structure exists elsewhere in the industry, in hedge funds and investment banks, says Nader Farahati, managing director for financial services of Mercer Oliver Wyman in London. "They are pure ideas and human-capital machines", he says. "The business is almost entirely based on the ideas and connections of their people. Employees are their only factor of production, and there is a direct linkage between compensation and production."

A variant of this model will be more common in the future, industry experts say. "If banks are outsourcing more and more functions and are increasingly inclined to offer the products of others, that means horizontal networking will be essential", says Mr van den Spiegel. The traditional hierarchy in a bank administration will have to adapt to this new environment."

Healthcare and pharmaceuticals

Foresight 2020: Healthcare and pharmaceuticals at a glance

The global marketplace: The healthcare industry will see rapid growth in demand over the next 15 years, thanks to demographic trends. The health services industry is expected to see the fastest rise in employment of any US sector, according to US government figures. With an inexpensive supply of highly trained researchers, China and India look likely to become a focus of product development and manufacturing activity in life sciences.

Products and services: In life sciences, biotechnology research seems set to deliver more new products than traditional molecular R&D activities. Gene therapy is likely to move from treatment of conditions to cures by modifying patient DNA.

The industry landscape: Rising costs in developed markets and inadequate provision in developing ones will lead to an increased role for the private sector. Health offshoring, especially when dealing with assessment of information that can be completely digitised, will increase.

Changing relationships: Co-operation will be a critical element of success. In life sciences, biotech and big pharma will work together to bring new products to market. Teams will co-operate globally on processes such as product development or test analysis. Increasing levels of patient choice and knowledge will place a premium on successful relationships between physicians and those in their care.

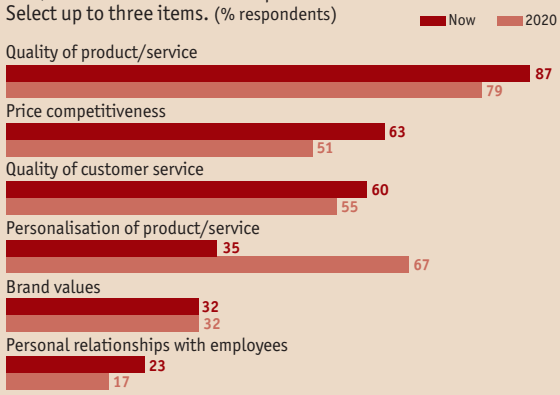
Corporate strategies: More pervasive use of IT will lead to more effective storage and retrieval of patient records, improved tracking of medical outcomes and better remote care. Automation of simpler processes will also free up physicians' time to focus on higher-value jobs such as diagnosis and patient communication.

117 respondents from the healthcare and pharmaceuticals sector took the survey. Half came from large companies, and half were board-level executives.

Key survey data

Industry executives believe personalised products and services will be second only to product quality in importance by 2020.

Which of the following is most important to your customers now, and which will be most important in 2020? Select up to three items. (% respondents)



Source: Economist Intelligence Unit survey, 2005, healthcare and pharmaceutical respondents.

Healthcare and pharma executives see knowledge management and customer support as having the most scope for future productivity gains.

Which of the following areas of activity offer the greatest potential for productivity gains over the next 15 years? Select up to three activities.
(% respondents)

Source: Economist Intelligence Unit survey, 2005, healthcare and pharmaceutical respondents.

Healthcare is a large, rapidly growing field in all developed and many developing economies. Across the OECD the industry averaged just under 8% of GDP in 2003, an increase of about 10% on the 2000 figure. The US healthcare sector is particularly large, accounting for roughly 15% of the world's largest economy.

Those numbers will keep going up. Health services, a subset of healthcare, is the biggest industry in the US in terms of workforce, employing 12.9m people in 2002. The US Bureau of Labor Statistics expects that number to grow by 16% by 2012, the largest increase of any US industry.

A changing marketplace

The healthcare industry will be affected by two major trends over the next 15 years: demographic shifts, particularly in developed markets, and globalisation.

The ageing of the world's population, owing to increased life expectancy and reduced fertility, will undoubtedly help to inflate demand for healthcare products and services. But these demographic dynamics will also beg extremely difficult financial and logistical questions.

The precise impact on costs is difficult to quantify, not least because of the phenomenon of compressed morbidity—the fact that many people are staying healthy to older ages. According to a study by the insurer BUPA, calculations based on assumptions of compressed morbidity can reduce projections of healthcare cost increases from ageing by 50-75%. But one thing is for sure—they will go up.

Dr Daniel Vasella, CEO of Novartis, says that countries will have to shift an ever-increasing proportion of GDP to healthcare, with the US figure potentially going from 16% to 20%. The elderly proportionally use greater healthcare resources, with a higher percentage suffering from multiple chronic conditions. In the UK, for example, those over 65 make up 16% of the population, but account for over one-third of hospital and community health spending. According to a McKinsey Quarterly report from 2005, Medicaid will consume over 75% of incremental state revenue in ten US states by 2009.

Obesity, especially in the US, is another driver of higher costs. More than 16% of US children are obese and the trend is increasing. Obesity is the source of chronic diseases like diabetes, coronary heart disease and osteoarthritis, and already created costs to the US healthcare system of an estimated US$150bn in 2005.

Labour will also be increasingly costly, as health systems around the world suffer seemingly perpetual staff shortages. The problem will only worsen because of ageing demographics within the medical profession, an issue that Joseph Mapa, CEO of Toronto's Mt Sinai Hospital, describes as "very serious".

Despite widespread efforts to contain costs, no consensus is emerging on the way forward. Australia is increasing its market element in healthcare to reduce expenses just as New Zealand is doing the opposite. Canadian courts have ruled it unconstitutional to block private care when people are dying on waiting lists. In the UK, Dr Jennifer Dixon, Health Policy Director at the King's Fund, a leading British health policy non-governmental organisation (NGO), notes that "the direction of travel" is towards public commissioning of an increasing amount of private

Defining terms

The healthcare industry is unlike any other. It works to different agendas, longer time-frames and greater scales than other sectors. Its scope is also remarkably broad. Boundaries between different industry sectors are not air-tight—some managed-care organisations run hospitals, for example—but a helpful three-part division runs as follows:

1. Life sciences and equipment manufacturers (such as pharmaceutical, biotech and medical devices companies);

2. Health services or healthcare providers (including physicians, dentists, hospitals, nursing homes, outpatient care, laboratories, etc); and

3. Healthcare commissioners (such as insurance companies, health information firms and managed-care organisations).

Know your enemy

The changing face of disease will be another critical determinant of how the industry evolves over the next 15 years:

More new diseases: Greater population density, increased travel and weather changes have increased the appearance of new pathogens. These are often viral, initially difficult to treat, and highly dangerous. Examples include ebola, SARS, and potentially avian flu.

Growing antibiotic resistance in existing diseases: The overuse of antibiotics, and the paucity of new ones in the pipeline, has left little defence against several previously contained pathogens. The US Centers for Disease Control and Prevention (CDC) claims that 70% of US hospital infections are resistant to at least one common antibiotic, and the World Health Organisation (WHO) reports worrying levels of multiple-drug-resistant tuberculosis.

New treatment for previously untreatable conditions: Gene therapy is likely to move from treatment of conditions to cures by modifying patient DNA. Combined with antibiotic resistance this may reverse the hierarchy of concerns about illness: cancer and various genetic conditions may be more easily treated than diseases arising from mutating pathogens.

provision, and the conversion of the National Health Service (NHS) into National Health Insurance is a distinct possibility.

Life sciences, too, will face major cost-control challenges. According to the Tufts University Center for Drug Development[3], the cost of developing a new drug rose by 7.6% per year in real terms between 1991 and 2001. The main drivers of these cost increases include new and more expensive medical technology and treatments, and more elaborate testing processes for new products as regulatory regimes evolve. Respondents to our survey cite rising regulatory costs as the biggest threat they face over the next 15 years.

A global marketplace?

Globalisation will also bring fundamental changes, not least in the area of product development, which sits alongside quality of management as the factor that executives think will do most to encourage growth.

India recently brought its patent regime into line with international norms, so its previously copycat industry is now focused on innovation. With an inexpensive supply of highly trained researchers, the country looks likely to become a focus of product development and manufacturing activity in the near future, whether for Indian firms or multinationals or both. India already has more drug manufacturing facilities approved by the US Food & Drug Administration than any foreign country, and is an increasingly popular place to do clinical trials.

Dr Vasella at Novartis expects the value of India's pharmaceutical market to grow tenfold in the next five years alone. China, especially if it allays intellectual property concerns, could prove an even bigger force: Novartis has experienced double-digit growth in China for the past ten years and expects China's pharmaceutical market to leap from US$6bn in 2002 to US$24bn in 2010. More generally, device and equipment manufacturers, just like those in other industries, will increasingly use Asian facilities and attempt to tap markets there.

As China and India grow in wealth and integrate with the world economy, their own healthcare systems will also present an opportunity for private providers. The existing state systems in both countries are creaky or even collapsing. Both governments are looking to put more money into the system, but it is clear that neither can provide the funds necessary to create a European-style state system. Since 1998, for example, China has required employers to purchase health insurance with medical savings accounts and has recently declared that it will develop a Western-style private insurance system. "We take developing markets very seriously", says Louis Dudley, BUPA's Group Director of Development.

An international trade in medical care services is also developing. Health offshoring, especially when dealing with assessment of information that can be completely digitised, has already begun. Facing skill shortages and the costs of paying for professionals on

3. "The price of innovation: new estimates of drug development costs", *Journal of Health Economics* 22 (2003), 151–185.

night shifts, some US hospitals are having radiographic analysis done by relatively inexpensive experts in India or Israel. Simon Stevens, visiting professor at the London School of Economics and President of UnitedHealth Europe, a health-management services company, expects such developments will in future "in some cases divorce the process of administering a diagnostic test from its clinical interpretation", and "potentially open up a more global professional services labour market" for the latter. As technology increases what can be done remotely, this practice will only expand, potentially to include consultations and certain procedures.

Patients are also taking advantage of international competition. The ill have always travelled to obtain treatments unavailable locally, but now some are going long distances for facilities offering better price, speed and amenities while providing similar quality. Such medical centres, which are appearing around the world, often link up with tourist facilities, so that the cost of the operation and a luxury family holiday are less than a privately funded treatment at home.

One clinic based in a major European airport offers everything from orthopaedics and cardiovascular treatment to plastic surgery, while providing a sight-seeing programme to the nearby city for accompanying family. Medical tourist agencies can now link up interested parties with various types of care in a variety of countries.

How far a market in acute care will grow is unclear. Acute care is made up of routine surgery, emergency care and chronic medical care. The last two types of care inevitably require local facilities and, as Dr Dixon points out, are usually the most costly services to provide. But Mr Stevens expects at the national level, and in some cases crossborder, "the development of branded networks of providers" in at least secondary and perhaps primary care.

IT health check

The life sciences arm of the industry has already thoroughly embraced IT. Dr Vasella, in considering research facilities, says that "computers have become equally as important as the lab bench" and at the production level in bio-tech and generics, one sees "a high level of automation which is replacing human work".

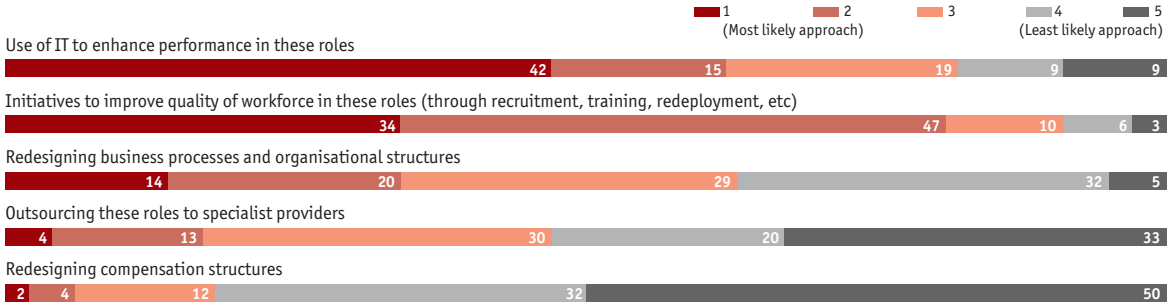
The introduction of IT has been relatively slow in healthcare provision, by contrast, but things are finally moving. "Technology is changing the look, feel and nature of healthcare", says Mr Mapa. Several IT applications appear ready to find broad adoption in the health services of wealthier countries in the near future.

The first is portable electronic health records giving access to an individual's detailed medical history as easily as a debit card allows access to bank accounts. Such systems will both improve the quality of diagnosis and treatment and make it easier for patients to change or have multiple care providers, such as one near work and one near home. It will also enable providers to deliver more personalised service to patients.

The tracking of health intervention outcomes—the systematic recording of the success rate of different approaches to treating a given condition—will also change medicine. There is the obvious medical advantage of helping to form and share best practice. Insurers seeking to contain costs have turned increasingly to medical information companies that are trying to compile data on relative efficacy. In recent years government commissioners have also used the data to seek value for money.

As information on intervention outcomes becomes more widespread and auditable, the structural implications for health services are potentially huge. Treatment will be pushed as much as possible to self-medication and monitoring, or to local doctors, while hospitals, in Mr Mapa's description, will return to their

How will your organisation seek to improve its performance in roles that require developed communication and knowledge skills?
Rank in order, where 1=most likely approach and 5=least likely approach.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, healthcare and pharmaceutical respondents.

original function of emergency medicine. The already growing international trade in selective medical procedures is also likely to increase as quality levels at foreign providers can be more objectively assessed.

Also on the horizon is the use of IT as a clinical assistant and advisor, in particular in chronic care. Devices that collect medical data in a clinical environment can already be designed to update records automatically, thereby reducing administrative time and errors and enabling more informed decisions. As technology advances, these devices will travel further from medical centres and be increasingly used at home.

More controversial is how far IT can be of use in analysing this data and making clinical decisions. On a simple level such activity has long taken place: Ardo Reinsalu, CEO of Docobo, an Estonian company making equipment to allow patients to monitor chronic conditions at home, notes that a heart monitor "by sounding an alert is already taking decisions". Once a condition has been diagnosed, much interpretation of test data involves comparing results to established norms and reacting accordingly.

Machines will do much more of this work in future, freeing up physicians for more difficult jobs, such as considering appropriate treatments, communicating them to the patient and—hardest of all according to Mr Reinsalu—making the initial diagnosis itself. Mr Mapa also hopes technology will allow more time for clinicians to focus on the more difficult parts of their job. Mr Stevens agrees that, in this area, technology and expert decision-support systems "will increasingly support and sometimes substitute for human judgements."

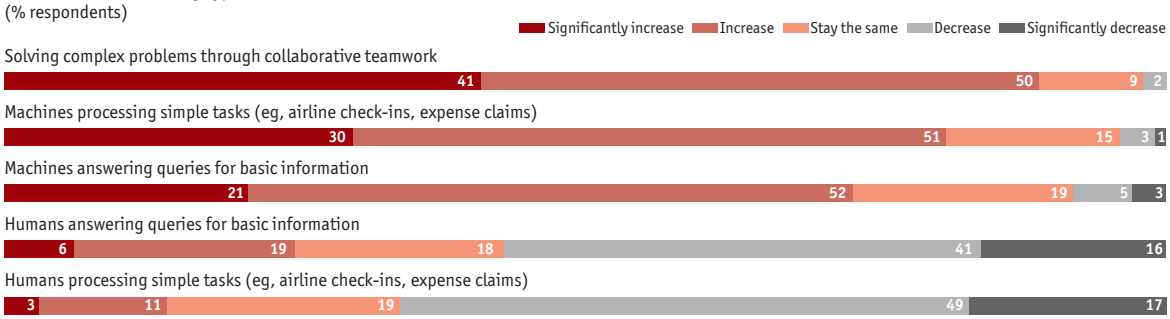
Art or science?

Amid so much flux, some essentials will remain the same. In the life sciences arena, Dr Vasella points out that his company's core mission remains the same in a very competitive marketplace: "to regularly discover and develop better medicines to ease suffering and help to cure patients worldwide". But here too, there will be substantial changes in how this ongoing mission is carried out.

Biotechnology research seems set to deliver more new products than traditional molecular R&D activities, which are delivering a shrinking supply of drug candidates to the discovery pipeline of big pharmaceuticals. Start-up biotech companies often have an edge in this area, but lack the resources and expertise of the bigger companies in bringing products to market, as well as the deep pockets to sustain costly failures.

Looking 15 years hence, a number of industry

How will communication outside your organisation change over the next 15 years? Please state what changes you expect in the volume of the following types of interactions between now and 2020.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, healthcare and pharmaceutical respondents.

pathways are possible. Some small biotech firms could grow in size and become rivals of big pharma. Large pharmaceutical firms could switch more heavily into biotech in their own R&D programmes, increase collaboration with smaller biotech firms, or, in a process similar to the IT industry, simply acquire biotech firms when they have a product worth developing. Some may well follow a combination of all these options.

Come what may, there is likely to be increasing co-operation across companies in order to integrate new partners, or newly purchased subsidiaries, into corporate activities. Dr Carlo Incerti, head of R&D Europe for Genzyme, sees small, flexible firms as the future in this field and goes so far as to say that communications infrastructure and information sharing across the organisation "has created our company". Survey respondents agree: nine out of ten executives in the industry expect to see an increase in problem-solving through collaboration.

Healthcare professionals will also need to develop new skills over the next 15 years, many focusing on the patient as an individual customer. Although personalised drugs are not on any realistic horizon, the so-called "patient-centred paradigm" is well on its way. Survey respondents believe that personalisation of products and services will be second only to quality in terms of value to customers. Mr Mapa agrees that "the relationship has got to change" to a "much greater partnership" between clinicians and patients.

In part that reflects greater patient choice. Insurance companies, for example, are increasingly providing health checks themselves. Pharmaceutical firms are also advertising directly to patients, especially in the US and New Zealand. Repeated studies indicate that the practice increases the tendency of doctors to prescribe drugs in general, and

What are the most significant barriers to improved relationships with customers, suppliers and other external parties that your organisation faces?
(% respondents)

Source: Economist Intelligence Unit survey, 2005, healthcare and pharmaceutical respondents.

the specifically advertised one in particular.

Patient deference is also disappearing as information increases. The Internet in particular is undermining medical professionals' monopoly of information, and therefore authority. In 2003, 65% of Canadian households had at least one member using the Internet to find medical information, its most popular use after e-mail and general surfing.

Life sciences are also affected: Dr Incerti notes that drug companies have to work together with patients in a way that is unprecedented for traditional pharma firms, but more in keeping with the habits of biotech start-ups. Treating people involved in tests as partners, rather than subjects, involves a host of changes, from the requirement for better interpersonal skills on the part of scientists down to basic questions such as how long to keep a control group on placebos if initial test results seem promising.

In such an environment, the workforce across the healthcare industry will also need to change. A majority of survey respondents identified lack of necessary interpersonal skills as the biggest difficulty in improving relationships with customers, suppliers and other external parties. "Gone are the days when scientists and clinicians were pontificating on the life and death of patients while hardly talking with them", concludes Dr Incerti.

Foresight 2020: Manufacturing at a glance

The global marketplace: Although the industrial base in developed markets will continue to be eroded as jobs transfer to emerging markets, fears of the demise of Western manufacturing are unfounded. Developed manufacturing economies will still hold an advantage in high-value and capital-intensive activities; proximity to customers will also be critical for many.

The industry landscape: The globalisation of manufacturing will continue apace, particularly in high-volume segments. The desire to move into higher value activities will encourage the emergence of original brand manufacturers (OBMs) in low-cost economies, manufacturers that design and produce under their own recognised brands.

Changing relationships: The vast majority of manufacturing survey respondents expect to involve their customers and suppliers more closely in their product development processes. Responsibility for solving production problems will increasingly be devolved down to the factory floor.

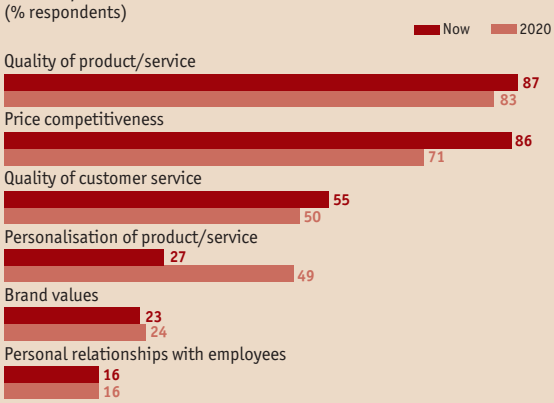
Corporate strategies: Generic and easily automated manufacturing processes will shift to low-cost locations, but rising demand for personalisation will lead many products to be customised locally. Efficiency throughout the supply chain will be a major source of competitive advantage.

154 manufacturing industry respondents took the survey. Half of them came from large companies and half were board-level executives.

Key survey data

Personalisation of products and services will jump in importance over the next 15 years.

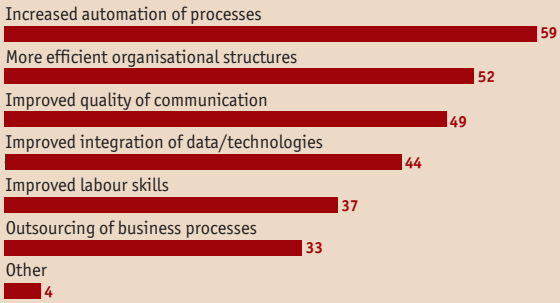
Which of the following is most important to your customers now, and which will be most important in 2020? Select up to three items.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, manufacturing respondents.

Increased process automation and more efficient organisational structures are expected to be key drivers of productivity gains.

Where will your organisation focus as it seeks to improve productivity growth over the next 15 years? Select up to three options.
(% respondents)

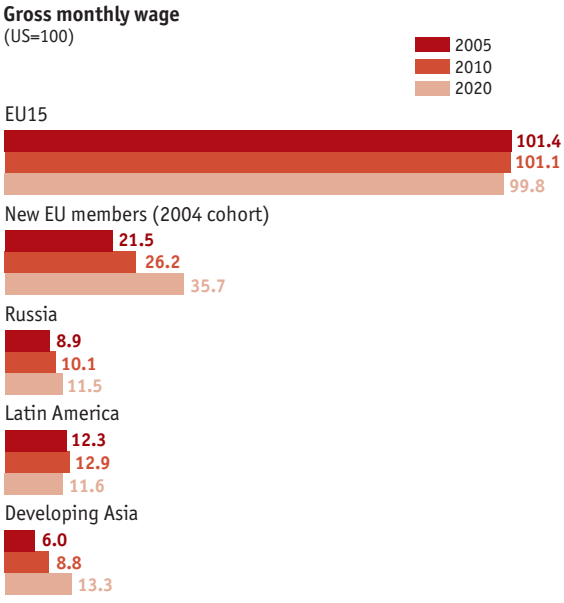


Source: Economist Intelligence Unit survey, 2005, manufacturing respondents.

The globalisation of manufacturing has been a hallmark of the past 15 years. The transfer of jobs in the manufacturing sector (especially, but not only, labour-intensive activities) from developed markets to emerging markets will continue over the next decade and beyond.

A majority of survey respondents from the manufacturing industry expect a low cost base to become more important as a source of competitive advantage over the next 15 years. For labour-intensive manufacturing, emerging economies will still wield an enormous advantage in this regard. Despite the expected strong growth in wages in many emerging markets, the differential with average wage levels in the developed world will still be enormous in 2020. Survey respondents put competition from low-cost markets and pricing pressures as the top two risks their organisations face over the next 15 years.

In China's case the average wage—at 5% of US and EU15 levels in 2005—will rise to about 15% of the developed-country average in 2020. The east European EU members' average wage is now 20% of west European levels, and this will rise to about one-third of the EU15 average by 2020. This also implies that the competitive threat to eastern Europe from other emerging markets will increase, especially in activities where high transport costs do not give east Europeans a natural edge in west European markets.



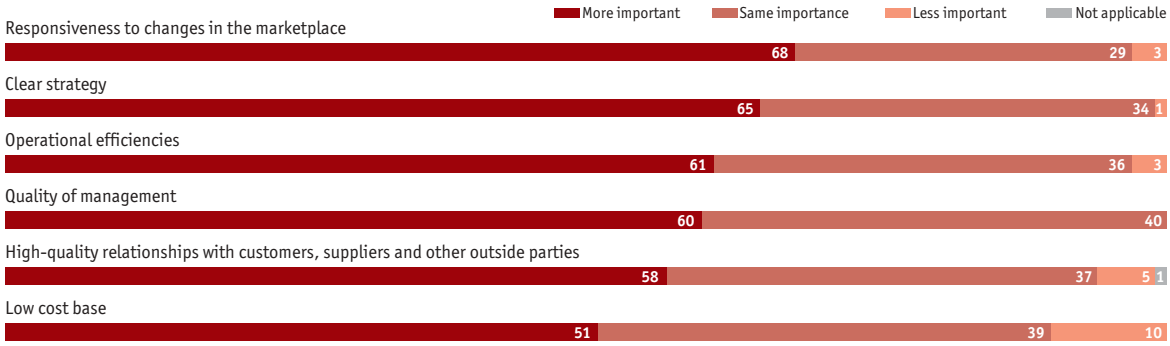
Source: Economist Intelligence Unit.

Emerging markets will not just compete on labour costs. Quality is also improving. Gernot Strube of McKinsey & Company, a consultancy, says that 70% of colour TV manufacturing took place in high-cost economies before 1990; 80% now comes off production lines in low-wage economies. There is also an abundant supply of skilled labour in emerging markets that can participate in higher-value activities such as product development and design, thanks to the digitisation and transfer of information.

Nevertheless, a wholesale shift in manufacturing capacity to developing markets is not on the cards. The attractions of low-cost economies are much greater for some industrial sectors than others. Where the product is labour-intensive, high-volume and has low transport costs, and the customer is price-sensitive—small home appliances, say—lower-wage economies will have the advantage. Where volumes are lower and capital investment and transport costs are higher—such as white goods—manufacturers will tend to settle within range of the end-market. In complex, high-end areas such as precision mechanical engineering, medical technology and aircraft manufacturing, developed markets will continue to wield an advantage.

Availability of supply is another key criterion. "A factor in locating our manufacturing is availability of raw materials. China and Taiwan cannot supply, and as we are based in Europe, we are close to key suppliers in Germany and France", says Paul Mayer, sales and marketing director of Braby, a niche manufacturer producing large storage tanks from aluminium and stainless steel. Expect to see more manufacturers from emerging markets pushing overseas in order to secure

How will your sources of competitive advantage change over the next 15 years? Please say whether you think each of the following will become more or less important to your organisation between now and 2020.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, manufacturing respondents.

rights to raw materials and natural resources.

Intellectual property is also a major determinant of investment strategy. If a company's competitive advantage is focused on the ownership of intellectual property rights (IPR), then manufacturing in less-developed economies, where the risk of intellectual property theft is higher, becomes a greater gamble. According to Chris Hibbs of PricewaterhouseCoopers, just how great a gamble depends on product life-cycles: "If, as with mobile phones, the IPR life-cycle is short, then the risk can be considered lower. Where the IPR is more stable, misappropriation would produce clear disadvantage."

Wanted: Everything, cheaply

As manufacturers seek to optimise cost control, operational efficiency and responsiveness to the local market, the answer for many organisations will be to disaggregate the chain of manufacturing processes into its component elements, some locally delivered, others centralised, and others still a mixture of both.

Many product development teams will globalise, for example, as the digitisation of complex designs enables information to be passed from timezone to timezone, cutting costs and cycle times. But at the same time, the vast majority of manufacturing survey respondents also expect to involve their customers and suppliers more closely in their development processes over the next 15 years, leading to greater interaction between local customers and R&D teams.

Generic, high-volume manufacturing processes will tend to shift to lower-cost locations as organisations seek operational efficiencies. Final assembly processes will often be localised, however, in response to rising demand for personalisation. As a result, greater customisation of standard designs will be a central attribute of the 2020 manufacturer.

"Modular design is critical to competitive advantage", says Ed Machala, senior vice-president, operations and chief operating officer of American Power Conversion Corporation (APC), a maker of power supplies and surge protection products. "While delivering manufacturing volumes, it also enables rapid customisation." APC plans to build its major sub-assembly plants in low-cost economies in order to reap the benefits of long, simple production runs, and to establish what it calls configuration-to-order centres in local markets. Mr Hibbs at PricewaterhouseCoopers compares this model with differing levels of service at financial institutions, with routine calls handled through automation and more difficult calls routed to call-centre staff.

This web of disaggregated and globalised processes places a heavy burden on all involved to raise the standard, frequency and quality of communication. From cross-functional communication within one organisation to interaction across the supply chain, operational integration of the entire manufacturing process will be key to success. Communications is central to success at Dell, which famously carries no inventory of finished goods and only builds a product when an order is placed. "Information flow is as critical as physical flow of product", says Nicky Hartery, Dell's vice-president of manufacturing operations, business operations and customer experience.

Designers will need to collaborate closely with manufacturing partners, both to stay aware of their increasing capabilities and to monitor changes in specification. It only takes a few production revisions for designers to lose touch with the manufacturing process. All too often, remarks Dr Strobe, changes are made on the line and not reflected in the documented process and therefore training. This is how different plants, and even different shifts in the same plant, unintentionally produce varying quality. At Dell, a dedicated engineering team examines the fine detail of the manufacturing process and introduces improvements across all plants.

Suppliers and subcontractors will become more tightly integrated. Survey respondents expect the number of suppliers they have to dwindle over the next 15 years, but to have stronger relationships with those that survive. "It is in the extended supply chain where gains can be made", says Ian O'Connor, UK supply operations director of JohnsonDiversey, an industrial cleaning products company. "There is a no point in a finely-tuned Dell if the feeds are flawed", agrees Mr Hartery.

For some, co-location will be the best way forward. Mr O'Connor cites the example of a bottle manufacturer that has plans to set up a production plant alongside a JohnsonDiversey manufacturing facility and literally push empty bottles through the wall, just in time. For others, multi-sourcing makes greater sense in order to manage fluctuations in demand and supply-chain problems. But all will look to improve communications: each one of APC's subcontractors has an on-site APC team, for instance, and key performance indicators are funnelled back on a daily basis.

Workers, evolve!

As velocity, customisation and efficiency becomes more critical, employee skills will also need to improve—especially when there is a problem to solve on the line. Over 90% of the manufacturing industry survey respondents expect to see an increase in problem-solving through collaborative teamwork between now and 2020. In the past, a problem on the floor would be pushed up the structure, taking weeks to resolve. Today and in the future, says Mr O'Connor, the operative locating the problem will call the supplier and take responsibility for resolving the problem during their shift. "If a decision to resolve a problem is not made quickly", agrees Joe Hartnett, CEO of US Robotics, "it can make the difference between freighting by air or by sea".

With a new way of working comes a new way of managing. Mr O'Connor admits that he has had to change his management style and propagate this across the team: "Years ago supervisors focused on keeping the team working, dealing with things like time-keeping. Today, they take more operational and strategic decisions."

Creating this self-sufficient workforce will not be easy. Most sector leaders expect greater investment in training and "upskilling" their workforce. At Dell, where operators build each complete unit themselves in a model known as personal build, staff already receive 40 hours training per person per year. IT will also improve performance. Over the next 15 years, executives expect the focus of their IT spending to shift towards customer service, performance

management and knowledge management from financial management, production processes and general IT infrastructure.

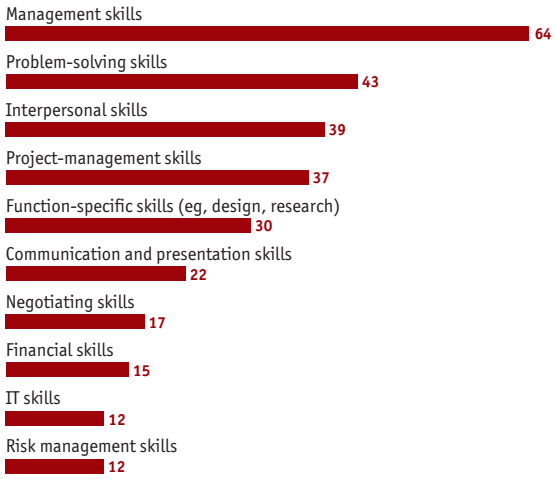
But perhaps the biggest challenge of all, especially in Western economies, will be attracting people to the manufacturing sector in the first place. "Manufacturing is seen as the poor relation", laments Mr Mayer at Braby. "Young people don't want to be welders, they want to operate computers."

Brand advantage

In a globalised marketplace, brand strength will also be an important source of advantage. "Brand will stand for consistency in quality, value and image", says McKinsey's Reza Shahrbabki. In developing manufacturing economies, the emergence of the original brand manufacturer (OBM), a manufacturer that designs and produces under its own recognised brand, will continue. Some will move up the value chain organically; others will create an OBM by purchasing the company they worked for as an original equipment manufacturer (OEM), thus obtaining Western design experience to add to their own in-house resources.

But for many manufacturers, the major challenge of the next 15 years will be realising the efficiency gains offered by globalising and networked manufacturing processes. Survey respondents believe that the production process is still the area of their business that offers the greatest scope for improved productivity, followed by customer service and supply-chain management. Improvements in all of these areas will lead the best manufacturers of 2020 to deliver the exceptionally high quality and speed of small hand-finished batches, at the cost of a high-volume manufacturer in a low-cost economy, with localisation in design and delivery.

Which skills will be most important to your organisation's success over the next 15 years? Select up to three options.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, manufacturing respondents.

Foresight 2020: Public sector at a glance

The external environment: Public agencies will struggle with an array of profound challenges over the next 15 years, made worse by funding constraints and rising citizen expectations. Ageing populations and rising healthcare costs will feature among the greatest challenges.

The public-sector landscape: Budget constraints and swelling demand mean that agencies will be expected to do more with less. There will be greater emphasis on technology deployment, on performance management and measurement, and on outsourcing of non-core services as a result.

Changing relationships: Government services will be designed and delivered to meet the needs of citizens and businesses. Effective collaboration with other agencies and private-sector organisations will be critical in enabling public-service organisations both to deliver better service and control expenditure.

Agency strategies: There will be a significant decrease in the number of simple processes being conducted by humans, as e-government spreads. Public-sector organisations will place an increasingly high premium on recruiting, training and redeploying employees capable of sophisticated judgements and communication.

134 public-sector respondents took the survey, 37% in Europe, 24% in Asia-Pacific and 19% in North America. Survey respondents in the healthcare industries are not included in this sample.

Key survey data

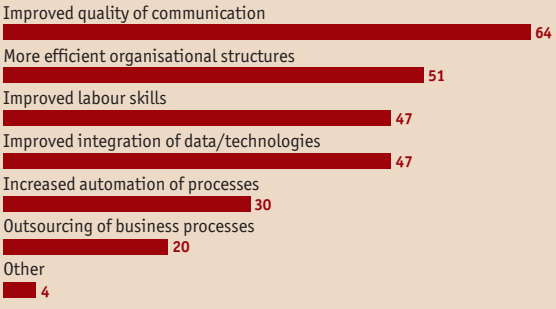
Respondents plump for management skills, interpersonal skills and communication/presentation skills as the qualities that will be most important to their organisation in 2020.

Which skills will be most important to your organisation's success over the next 15 years? Select up to three options.
(% respondents)

Source: Economist Intelligence Unit survey, 2005, public-sector respondents.

Better communication and more efficient organisational structures are expected to be the major sources of productivity gains.

What are the most significant barriers to improved relationships with customers, suppliers and other external parties that your organisation faces? Select up to three options.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, public-sector respondents.

From security threats to ageing populations, education requirements to healthcare costs, governments and public agencies will struggle with an array of profound challenges over the next 15 years.

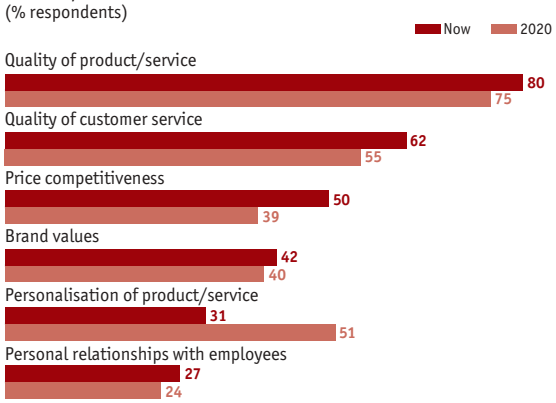
By 2020, for instance, the world's developed nations—including the US, western Europe, Australia, New Zealand and Japan—will have no choice but to confront the problem of demographics. "Five years from now the baby boomers will begin retiring", says John Rother, policy director at the American Association for Retired People (AARP). "Over the next 10-25 years, there's going to be a lot more people retiring than there are entering the workforce."

As the size of the workforce declines, funding for healthcare and pension assistance will shrink. Compounding the problem is an erosion in the private sector's willingness to deliver defined healthcare and retirement benefits to the majority of their employees, as well as longer mortality and rising healthcare costs. Governments will wrestle with a number of options, from higher retirement ages to tax-free income beyond the minimum retirement age, but the fundamental and unappetising choice is between higher taxes and lower benefits.

Another critical issue for governments and societies is determining how best to educate a workforce ready for the challenges of a globalised 2020 economy. According to Marty Markowitz, president of the borough of Brooklyn, New York: "Our public schools are simply not educating the workforce we will need in the future." As well as changes to school curriculums, expect wider use of incentive pay for the most successful public school teachers and districts, as well as vouchers, a sort of tax rebate that allows families to pay for the school of their choice (essentially forcing public schools to compete both with one another and the private sector).

Issues such as healthcare and education also plague many emerging-market nations, of course, though often from a vastly different perspective.

Which of the following is most important to your customers now, and which will be most important in 2020?
Select up to three items.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, public-sector respondents.

"European or North American citizens complain when they have to pay high costs for advanced medicines and therapies", observes a senior emerging markets economist with the World Bank. "Contrast this with the need to travel two or three days—while sick—to the nearest clinic for the most basic of treatments." As a result, many emerging-market nations will focus primarily on finding the capital, often based on public-private partnerships, for basic infrastructure improvements.

Whatever the issue, whether ensuring national security or setting environmental and energy policy, the scale of the task facing the public sector is made even more daunting by rising citizen expectations. Consumers of government services are increasingly demanding, intolerant of both poor service and higher taxes. "People pay an awful lot of taxes, and they expect better service from government", says Steve Westly, controller for the state of California in the US. The rules-driven, inflexible, one-size-fits-all approach to government is on its last legs: 80% of respondents say that in 15 years, their "customers" (citizens and businesses) will place a higher premium on personalisation of service.

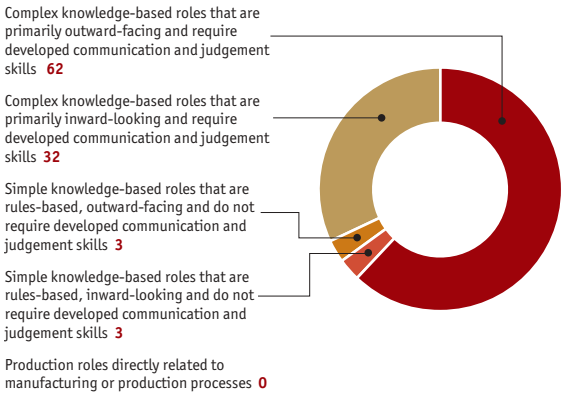
Customers, always right

"There's an increasing call for government to be more customer-service oriented", says Mr Westly. Sargeant Green, general manager of the Tranquility Irrigation District in California, says that consumers of government services today "expect what they want, when they want it. And if they don't get what they want, they show up at board meetings and they're in your face." Consequently, says Mr Green, government agencies "have to become more responsive and develop the tools to deal with a more sophisticated and demanding consumer".

What that means in practice is making simpler processes even easier, usually through greater use of technology, and enhancing the quality and accuracy of complex ones. Survey respondents expect to see a significant decrease in the number of simple processes being conducted by humans, as e-government spreads. Examples already abound. City officials in Eugene, Oregon are expediting the review, approval and compliance of building permits by providing online portals. In Northern Ireland, a majority of solicitors are using a digitised land registry service to conduct conveyancing of property and land. More than 10% of Finnish companies perform their value-added tax (VAT) reporting online. Citizens the world over are increasingly provided with web access to help save time with everything from applying for healthcare benefits to renewing automobile registrations or licence permits. "Online, not in line" will be the mantra of the next 15 years.

Self-service options and automation will become more important, but personal interactions between citizens and public-sector employees will also need to change and improve. Softer relationship skills will be critical to the public-sector employee of the future. Respondents plump for management skills, interpersonal skills and communication/presentation skills as the qualities that will be most important to their organisation in 2020. The overall size of the workforce may not necessarily increase, says Mr Green, but the ones you do hire will have to be well educated to keep up with the higher expectations of customers. Moreover, because problems are often multidisciplinary, staff will need significant cross-training. "Public entities are recognising that they need professional capabilities to deal with ever more sophisticated customers", he says.

Which of the following types of role will be most valuable to your organisation as a source of competitive advantage in 2020?
(% respondents)



Source: Economist Intelligence Unit survey, 2005, public-sector respondents.

Such high-value skills do not come cheap, of course, and most agencies will continue to be constrained by limited public funding. But public-sector respondents see plenty of scope to improve productivity through better communication and more efficient organisational structures. A majority of respondents say that their organisations will feature fewer layers of management and 60% say employees will have greater decision-making autonomy. Frontline employees will also become more technologically savvy: enhanced use of IT is seen as the most likely route to improved performance in areas that require developed communication and knowledge skills. Respondents expect the focus of technology investment for public-sector organisations to shift from general IT infrastructure, procurement and financial management and reporting today to strategy

and business development, knowledge management and product development by 2020.

Interestingly, ageing populations may play to the public sector's advantage, at least in this regard. The large wave of retirements expected to occur within government workforces in the forthcoming years will enable an influx of more technology-proficient employees.

The importance of collaboration

Better knowledge management, reconfigured organisations and more skilled personnel will enable organisations to collaborate more effectively, another major trend of the next 15 years. "A lot of local government agencies are learning that there's mutual benefit to co-operating or collaborating with the public they are in place to serve", says Bill Beach, director of the centre for data analysis at the Heritage Foundation. "Much of the time, an effective response requires multiple groups in the community or multiple agencies to work together." Nine out of ten respondents say they will increase or significantly increase collaborative teamwork outside the organisation to solve complex problems.

Partnership and collaboration is essential when balancing the competing interests of different groups.

The business of education

Current practice in most developed nations is that education is the business of government. Some call it a monopoly—one that systems such as school vouchers are designed to challenge—but there are other models that may gain greater traction over the next 15 years. One example of businesses collaborating with a local public school system to improve the quality of education is the Ariel Community Academy.

The Ariel Community Academy is an inner-city Chicago public school with 400 students aged 5-15. As Matthew Yale, vice-president of public affairs for Chicago-based Ariel Capital Management, explains, his company, along with a second local investment company, Nuveen, have partnered with the local school district to improve the educational experience.

Support for the school takes many forms. Employees from both companies are encouraged to play an active role in the classroom as well as in the personal lives of the students. In many cases, Ariel Capital Management or Nuveen executives work with teachers and other experts to develop practical classroom experiences. In addition, there's a Saturday morning tutor programme where volunteers from the two companies provide extra help for kids in reading and maths. "Employees are encouraged to participate", says Mr Yale, "and we make it easy for them to do so".

Perhaps the most visible support for the school comes in the form of real-world lessons underwritten by the sponsoring corporations. Upon entering the academy as first graders, each class is given US$20,000 to invest. Executives from Nuveen and Ariel Capital Management then assist the students in managing and monitoring their portfolios. Along the way, of course, the students also learn skills in mathematics, basic economics and reading. As the students get older, they take a progressively more active role until by age 13 or 14 they're doing their own research, making their own investment decisions, and even participating in meetings with company analysts.

Upon graduation, each class is left with a significant nest egg, half of which is directed to philanthropic use (the first class to graduate used their accumulated capital to purchase a sound system for the school), and half of which can be distributed in cash or invested in a state-sponsored college savings programme. If the latter, says Mr Yale, "we match it, and that gives them a leg up on saving for college".

As for the quality of the programme, Mr Yale believes the results speak for themselves. The first class of students to complete all eight grades at the academy graduated in 2005: 80% of students got in to the most selective high schools in Illinois and Wisconsin, and 38% passed in high school algebra, traditionally one of the most difficult subject areas for inner city students.

Why do these companies make the effort? Corporate social responsibility plays its part. But both Ariel and Nuveen recognise that they also reap numerous benefits. "It's a great tool for recruitment and retention—people want to work for a company that shows commitment to the community", says Mr Yale. In addition, the companies are simultaneously creating financially sophisticated families and an educated workforce, not to mention potentially loyal customers for the future. "It's absolutely a win-win proposition", says Mr Yale, "and it's something we believe other companies and other schools should be looking into".

"Take a look at container shipping, for example", says John Mohan, public affairs specialist with the US Department of Homeland Security. "There has to be a balance between enabling commerce and at the same time securing the supply chain that necessarily requires working in close partnership with shipping companies and businesses." Through collaboration with businesses, the US Customs department and the Department of Homeland Security are developing means to expedite shipping without compromising security.

Collaboration will also take the form of outsourcing and offshoring arrangements with outside contractors. As a spokesman at Commonwealth Business Council Technologies explains: "As citizens demand that their local boroughs and councils do more with less—they shouldn't be surprised when the agencies use offshoring to do so." Various UK ministries have already offshored activities ranging from traffic control to diagnostic radiology services. Australian agencies are consolidating and offshoring significant tranches of IT and other back-office functions. To be effective, such collaboration will require a massive standardisation of processes, data formats and technologies across government.

The public sector will also collaborate more intensively with local community groups and businesses to solicit manpower and resources, reducing costs and improving outcomes in the process. "The great division of the 21st century will be between those governments who try to do everything for everyone and those agencies that seek partnerships and collaborations within their communities to share the burdens", says Mr Beach.

Foresight 2020: Telecoms at a glance

The global marketplace: Telecoms services are being commoditised. Asian companies are leading investment in mobile broadband, which could give them an edge in developing new software and services that they can then sell to service providers in other regions.

Products and services: Prices for voice transmission will keep coming down as more traffic migrates to IP-based networks. Content-based services and software innovation will be the key to growth.

The industry landscape: Interactions between content providers and telecoms providers will increase. The main competitive threats to telcos will come from outside the traditional telecoms industry, particularly for consumer applications. Further crossborder consolidation is likely among fixed-line operators.

Changing relationships: Skillsets at telecoms firms will need to change. As operators' focus moves to content services, emphasis will be placed on creativity, an understanding of what makes different customer segments tick, marketing skills and an ability to make and manage commercial content agreements.

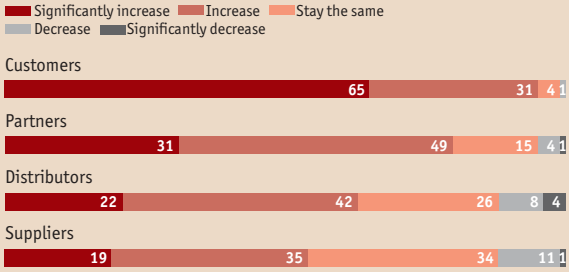
Corporate strategies: Some operators will reinvent themselves as content distributors and even creators. Others will choose to focus on the business market, serving the communication needs of large enterprises and acting as systems integrators and consultants.

44 executives with telecoms services providers took the survey, 38% in North America, 32% in Europe and 16% in Asia-Pacific. More than half were board-level executives.

Key survey data

The vast majority of service providers expect to increase their interactions with customers and partners.

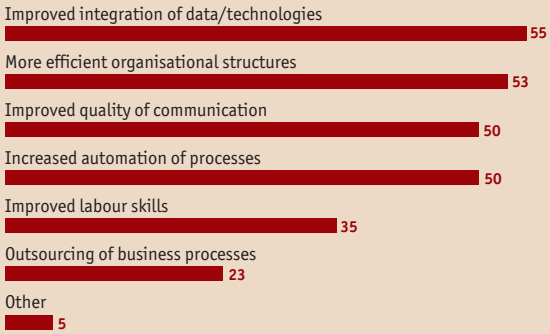
What change do you expect in the numbers of external parties that your organisation interacts with over the next 15 years?
(% respondents)



Source: Economist Intelligence Unit survey, 2005, telecoms services providers.

Better data and technology integration and more efficient organisational structures are expected to be the key drivers of future productivity gains.

Where will your organisation focus as it seeks to improve productivity growth over the next 15 years?
Select up to three options.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, telecoms services providers.

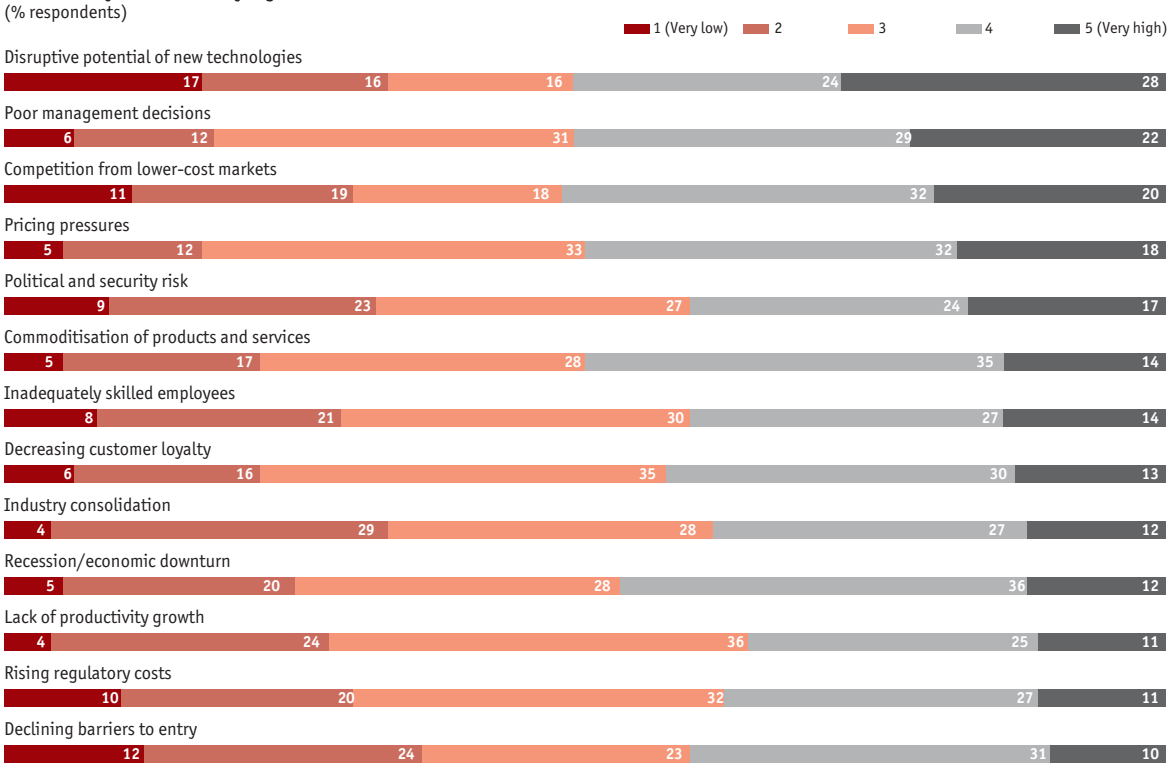
If today's telecoms service providers want to be in more than the business of providing a commodity service business in 2020—indeed, if they want to be in business at all—they will have to alter radically the services they sell, how they sell them and the way in which their employees work.

What this means in practice is a focus on new services that are attractive to customers and easy for them to use. This sounds unremarkable, but it will entail a radical shift for both fixed-line and mobile providers as the migration of traffic to Internet protocol (IP) networks reduces prices and redefines how and where telecoms operators make money. Respondents to the Foresight 2020 survey from telecoms service providers rated the disruptive potential of new technologies as by far the biggest risk they face over the next 15 years.

Fixed-line operators are under enormous pressure as the use of Voice over IP (VoIP) on fixed-line networks drives voice pricing close to zero, and as the fixed-to-mobile convergence trend threatens their residential customer base. "All so-called incumbents have to exit their traditional business and focus on new businesses", says Anders Igel, CEO of TeliaSonera. "All employees have to change."

But mobile operators also face a wrenching transition over the next 15 years. Although there is still tremendous growth potential in emerging markets, mature markets are increasingly saturated. Tariffs are also under threat. Up to now, ownership of a mobile network has provided a buffer against price erosion in voice services: mobile services still

In your view, how threatening are the following risks to your company between now and 2020? Rate each risk on a scale of 1 to 5, where 1=very low and 5=very high.
(% respondents)



Source: Economist Intelligence Unit survey, 2005, telecoms services providers.

command a significant premium over fixed services. Vodafone currently draws 81% of its revenue from voice; by comparison, BT now earns only 20% of its revenue from voice. But operators expect mobile VoIP—or another technology that makes it easy to provide cheap, or free, mobile voice—to be prevalent long before 2020.

New products, new rivals

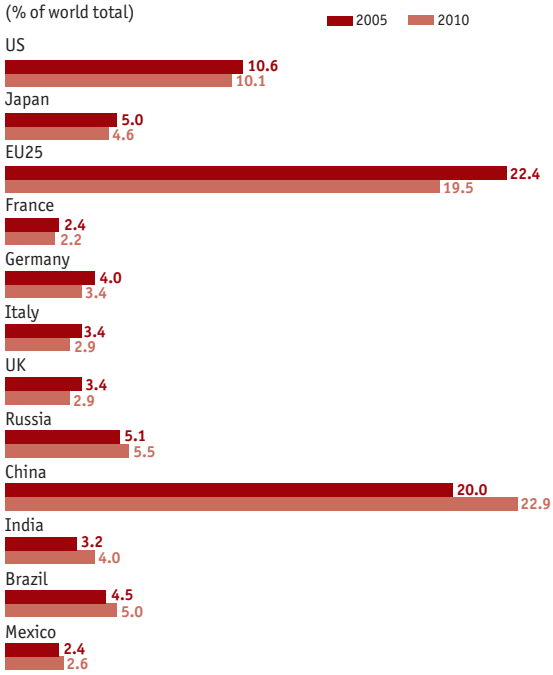
If the telecoms infrastructure itself offers little more than a commodity service and competition is here to stay, the burning question for telecoms operators is where their profits will come from over the next 15 years. The one point of agreement is that whatever course operators in mature telecoms markets worldwide take over the next 15 years, the future will not be about simply selling access lines and calls.

Like other former national monopolies, TeliaSonera, which was formed from the merger of the national providers of Sweden and Finland, traditionally hired networking engineers to install and integrate complex legacy networks. TeliaSonera still runs networks and still offers custom-built business services, but an infrastructure-based response will no longer be the mainstay of its business. Instead, Mr Igel wants staff to create and market new mobile- and Internet-based services—such as online gaming, music downloads or mobile TV—that can be sold across its footprint.

He is not alone. In France, where cable TV coverage is patchy at best, telecoms operators have built up a combined approximate total of 400,000 subscribers to television services two years after initial launch. In Japan, NTT DoCoMo has gone so far as to take a 2.6% of Fuji TV as part of its bid to sell mobile TV content.

"More profit will come from the content side. Infrastructure will become very reliable and low-cost", agrees Sachio Semmoto, CEO of eAccess, a Japanese fixed and mobile broadband access and service provider. Mr Semmoto is building his company's future

Mobile subscribers
(% of world total)



Source: Economist Intelligence Unit.

on broadband mobile networks, which, if all goes according to plan, will be a loss-leader on the back of which high-margin content is sold.

Asian companies are leading investment in mobile broadband, which could give them an edge in developing new software and services that they can then sell to service providers in other regions. In South Korea, operators are building WiBro, a mobile IP network that offers fast download speeds in urban areas. NTT DoCoMo of Japan is one of the companies developing 4G, which converges mobile networks such as WiBro or 3G, into a larger mobile IP network. In developed Asian markets 4G will be ready for deployment within the next five years. In Europe and the US mobile operators are likely to hold off 4G for another 10 to 15 years.

Innovation in the future will be largely software-based. As a result, the biggest threat to existing and

future revenue may come from companies with no networks at all, such as Google, Microsoft and eBay (recent purchaser of Skype, a VoIP provider), through services such as VoIP, video-conferencing, or services yet to be developed. Telecoms operators are well aware that customers could use their networks as a cheap conduit to other service providers.

"No one is guaranteed a seat at the table [in 15 years' time]. The biggest companies may not be network-based, they may be Google, or others", admits Dennis Weller, chief economist of Verizon. By 2020, for example, chip technology could well have advanced to the point where consumer goods, be they phones or shoes, exchange information without recourse to network intervention, or an operator's integration skills.

Some believe that operators may decide to pull out of the retail communications business altogether, leaving it to the big consumer brands, such as Tesco or Hermes. Allen Tympany, CEO of Vanco, a company that provides managed services over leased networks, likens the sale of consumer services by telecoms network operators to the sale of kettles and other electrical goods in electricity boardroom showrooms. Just as no one today would think to buy a kettle from the local electricity company, so, he argues, in 15 years' time no one will turn to a network operator for retail services.

This would leave telcos to focus on business-to-business services, believes Andy Green, CEO of BT's Global Services. Once service providers no longer have to worry about managing the end-consumer's gaming application they could morph into security and systems integration firms serving the communication needs of large enterprises. There are, of course, already businesses active in that sector. But selling value-added services to bread-and-butter business customers is a route that many telcos are eyeing.

France Télécom, for example, believes that the money that accrues to operators will come less from data transmission, more from providing consulting, integration and security. There is also the possibility that a communications company could end up looking like a credit card company, holding customers' content information and security settings, says BT's Mr Green. Operators would sell infrastructure and intelligence to firms that then embed communication capabilities such as radio frequency identification (RFID) tags in their own products. A firm like Prada, for example, may decide to equip its clothes with a mobile communications device and offer its customers a post-sales service managed by an operator.

Collaboration is king

Knowing you have to move is one thing, choosing the right direction for the jump is another. Today's telcos may be tomorrow's media and content companies. Equally they may be simple utility companies, investing capital in long-term infrastructure builds and leasing network to the service companies they did not become.

If they are going to provide new content, new applications or new business solutions, telecoms firms will need to focus on improving the customer experience and developing the skills and processes necessary to provide quality services.

Just as in the dotcom days, talk is of future consolidation and of a collision between the worlds of content and infrastructure providers that will result in a radically different market structure. The merger between AOL and Time Warner in 2001 failed to create a new converged media and communications giant, but that won't stop the industry trying again. "Just because it didn't work before, doesn't mean it won't work in [the next 15 years]", says Michel Paulin, managing director of Neuf Telecom, a French fixed-line operator.

Providing customers with systems integration, security management, premium content and other, as yet undreamt of, services means either having to come

up with new applications internally or forging and managing new partnerships with others. The latter approach will mean an increased co-operation with media, publishing, film, gaming, electronic device manufacturing and software companies that have the goods to keep the customer satisfied.

Three-quarters of the executives surveyed expect the number of partners they work with to increase or significantly increase over the course of the next 15 years. Many of these partners will be in developing markets, with Chinese and Indian firms leading the field. Data and technology integration will become ever more important as a result: respondents expect this to be their principal focus of productivity growth over the next 15 years.

The new model of focusing on the provision of content and other services will require much greater interaction not only between the telco and its suppliers and partners, but also between the telco and its customers. More than 85% of respondents at telecoms service providers hope to involve customers more closely in product development over the course of the next 15 years. After all, groups of consumers not only serve to fine-tune new applications, but can also provide effective word-of-mouth marketing. Neuf Telecom wants to encourage the growth of communities of users that try out and make suggestions about its products and services, for example, similar to those that exist around personal computer (PC) and Internet applications.

The shift in the telecoms industry also looks set to change the traditional relationships between telcos and their own equipment suppliers, as the latter seek to expand their margins away from the provision of increasingly standardised products. Some equipment manufacturers in high-cost, developed markets hope that their telco customers will outsource a greater number of functions, including the running of networks.

Internally, the skills required by telecoms service providers will also change. Mr Paulin plans to hire more, and more creative, software developers at the expense of network engineers. These latter roles will remain, but they will be fewer in number as the networks standardise and become simpler to operate.

Hiring software engineers alone, though, will not suffice. Providing a range of content services demands creativity, an understanding of what makes different

Europe's fixed-line operators

European fixed-line incumbents face a particularly daunting set of challenges as they seek to adapt to a shifting industry landscape. Many still have a bloated cost base. TeliaSonera, for example, which is the only telecoms operator in Europe to result from the merger of two former national monopolies, is present in seven countries in the Nordic region and it has yet to streamline its operations. This means that everything it does, it does sevenfold, be it administration, procurement or product development. Centralising these functions will greatly cut both staff and costs.

Other fixed-line operators also need to move beyond their national markets to grow. "Will Belgacom employ 15,000 employees in Belgium [in 2020] for 10m subscribers? Probably not," says Bridget Cosgrave, President of Belgacom Carrier and Wholesale, the wholesale arm of Belgian operator Belgacom. "If they are supporting subscribers in other countries, then maybe."

It may not be up to Europe's operators to decide how crossborder integration plays out, of course. India's VSNL is one operator that has made clear its intentions to become a global player through acquisition. But ideally, pan-European consolidation will reduce costs, allowing those left both to develop services and source equipment centrally, and to deliver locally-branded products. This all takes time, however: the job may not be done by 2020.

customer segments tick, marketing skills and an ability to make and manage commercial agreements. Many telecoms operators, used to providing one-size-fits-pretty-much-all voice and data transmission and network integration, admit they have much ground to make up. As Verizon's Mr Weller points out, the as-yet-unsolved organisational challenge within telcos is how to bring together creative people and engineers.

Even new entrants such as E-Access in Japan will have to reshape the mind-set of employees in order to meet service requirements in coming years. "Infrastructure employees are very different to content company employees", says Mr Semmoto. "They are more systematic and rules-oriented. There [will] be a mismatch when these merge and as a telco executive I have to manage that mismatch." The sort of "rules-oriented" employee required to build a fail-safe network could even be an obstacle in the future. Industry executives cite the lack of interpersonal skills as the biggest barrier they face to improved relations with customers, suppliers and other partners.

This is why telecoms executives will increasingly seek staff that can engage in intricate decision-making processes with other parties, be they suppliers, partners or customers. It is also why survey respondents emphasise the need to have the right people at the top to steer a course through the industry's turbulent waters.

Chapter 3 The company

Foresight 2020: The company at a glance

Automation and process improvements will continue to be a major focus of activity in many companies. But the hunt for competitive advantage will increasingly focus on improving the productivity and performance of knowledge workers.

Specialisation will be a defining trend at the firm level and below. Industries will polarise in response to commoditisation. Processes will be outsourced or offshored in accordance with where they are done best. Products and services will become more personalised.

Collaboration inside and outside companies will widen and deepen as internal teams work across time zones and functions, as customers demand ever more of companies, and as companies demand ever more of suppliers. Relationship skills will be at a premium.

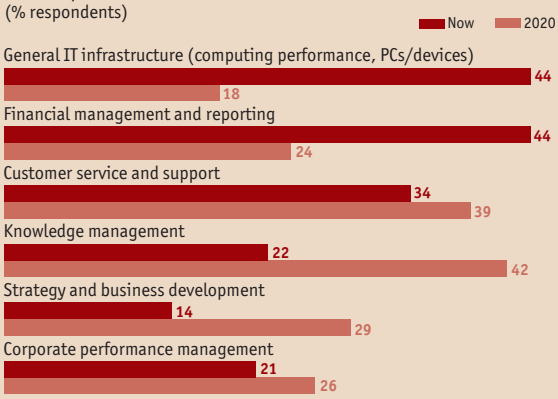
Technology will help knowledge workers perform better, thanks to new collaboration and communications tools; new ways to store, filter and retrieve unstructured data; and decision-support tools that expand and enhance knowledge workers' abilities.

Organisations will become flatter and less hierarchical. Employees will be given greater decision-making autonomy and will participate more actively in corporate planning.

Key survey data

Knowledge management will become the key focus of information technology (IT) investment in 2020.

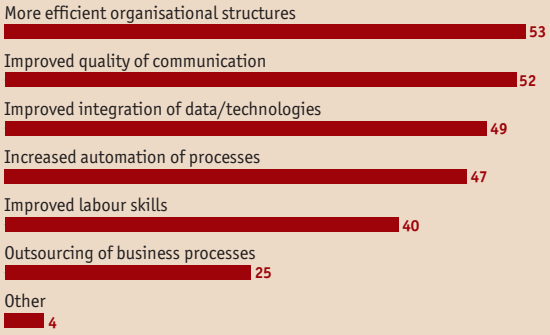
What are the top three areas of focus for IT investment at your organisation now, and what will be the top three areas of focus over the next 15 years?
Select up to three activities.
(% respondents)



Source: Economist Intelligence Unit survey, 2005.

More efficient organisational structures and better communication are expected to be major sources of productivity gains.

Where will your organisation focus as it seeks to improve productivity growth over the next 15 years?
Select up to three options.
(% respondents)



Source: Economist Intelligence Unit survey, 2005.

Standing back to view the picture so far, what environment will the company of 2020 face? Much will still depend on geography, size and industry, of course. A healthcare provider in continental Europe will face a very different set of challenges to a provider in India. An automotive manufacturer is likely to be less focused on the implications of demographic change than a financial services institution. An energy firm will tend to place more weight on relationships with government than a consumer packaged goods firm.

But the distinctions are arguably less striking than the similarities: the executives of tomorrow will face a host of shared challenges, opportunities and trends.

- **Globalisation.** This may not yet be Asia's century, but the continuing rise of emerging markets, particularly China and India, will rebalance the corporate agenda. Growth opportunities will be driven by non-OECD markets, in the eyes of a majority of survey respondents, even as mature markets retain their economic primacy. The proportion of employees or partners working in overseas markets will increase. And materials, services and talent will all be sourced on a global basis.

- **Demographics.** Survey respondents tend to take a sanguine view of coming demographic shifts, with a majority believing that ageing populations in developed markets represent an opportunity rather than a threat. Whether they are becoming greyer, likelier to live alone or more multi-ethnic, trends in population profiles will have a significant impact on companies' product mixes, employee profiles and customer service strategies.

- **Commoditisation.** Pricing pressures and competition from low-cost markets are seen as two of the three most critical risks that survey respondents face, behind poor management decisions. Operational efficiency will become more important over the next 15 years as a result, although returns from operational improvements in developed markets in particular will diminish as many industries approach an efficiency frontier and as scope for consolidation reduces.

- **Customer power.** Customers are expected to become more numerous, more dispersed and more demanding—respondents believe that personalisation of products and services will grow in importance relative to price competitiveness. Companies will seek to form higher-value relationships with customers in order to differentiate themselves from the pack and to foster loyalty.

- **Specialisation.** Increased competition, improved networking technologies and global sourcing will encourage specialisation. Some industries will polarise between high-end and mass-market providers, leaving little in the middle. Some companies will concentrate on distribution, others on products. Processes from manufacturing to HR will disaggregate into generic elements that can be outsourced or delivered centrally at low cost and bespoke elements that are delivered locally at premium prices.

Where does this leave the 2020 organisation? Doing the basics well will be essential. Competition is too fierce and customers too demanding for inefficiencies not to be punished. Work will flow to where it can be done best, and for the best value. Processes will be automated and refined. Networks of suppliers and partners will become more complex as a result, increasing the importance of effective collaboration between and within different organisations.

Running an efficient organisation is no easy task, of course, but it is unlikely on its own to offer lasting competitive advantage. Products and processes are too easily replicated; automation of simple tasks and

transactions is increasingly widespread. Instead, organisations will increasingly differentiate themselves by the way they and their staff handle the personal interactions that matter most to customers and partners. From the quality of investment advice offered by financial services to the accuracy and empathy of diagnosis by doctors, from closing the sale on the shop-floor to helping firms improve their energy efficiency, products and processes will become less important, in relative terms, than relationships.

The future of buying and selling

"All of us will get better at differentiating our customers and approaching them in different ways", says David Noe, vice-president of marketing and sales at APL Logistics, a US$1.1bn logistics company that is part of one of the largest container shipping lines in the world.

Mr Noe expects customers to polarise. Selling will either be a relationship-intensive process or a technology-intensive process, depending on the strategic value of the customer. Low-value customers that are shopping for low prices will be targeted via electronic media services and features that track and analyse their buying history. Data mining and customer relationship management (CRM) applications will be critical to succeeding in this automated, low-cost channel. High-value customers that need solutions will receive personalised services. APL's large, global customers will need a "solution sell" that explains how the pieces fit together and consists largely of free consulting services mixed with software tools. The sales cycle will be longer as the problems increase in complexity.

Of course, high-end customers will also look for low-cost, efficient transaction services, and many "low end" customers have the potential to move up the value chain. One critical challenge for organisations will be to develop customer information and communication tools to capture such "crossover" consumption.

At the other end of the product chain, the relationship between buyers and suppliers will also be far more symbiotic by 2020. Buyers will differentiate between strategic and tactical suppliers. They will develop tight personal and technological linkages to their strategic suppliers, while forming sophisticated "neural networks" of intelligent electronic agents to purchase from low-cost, tactical suppliers.

Non-strategic, or commodity, supply relationships

Putting you through

Telecom Service Centres (TSC), a UK-based operator of call centres, is building out extensive capability in multimedia contact management, including streaming video, web chat and emerging technologies, that will enable it to match increasingly challenging customer expectations of the perfect customer service experience.

Between them, the centres communicate with all segments of the population, from elderly people who have questions on how to operate a PC, to children who want to know how to work the toys they got for Christmas, to customers who want to order apparel through mail-order discounters. Today, TSC handles human voice, computerised voice recognition, e-mail and web chat. Tomorrow, it will adopt third-generation (3G) handsets with streaming video and any other emerging technologies, media and customer segments.

Contact centres like TSC's will "flatten the world", in the words of Thomas Friedman, by channelling the work to where it is best done. With just a wireless trunk line and hundreds of "seats" around the world, TSC matches projects from customers with "high-touch" customer requirements to contact centres with the skills and equipment that meet those expectations. If Scottish workers handle English-language phone calls more adeptly than Indian ones, that's where those projects will be processed. And if Indian employees provide better value for back-office services such as e-mail management and form-filling, the firm will direct that work to India.

will be characterised by outsourced, offshored and increasingly automated buying processes. Strategic supplier relationships will be characterised by ultra-high product and service quality and flawless communication. "The level of communication exchange will need to increase at least tenfold between now and 2020", says Joseph Yacura, chief procurement officer for Intercontinental Hotels.

Buyers will also expect their strategic suppliers to drive innovation. "The shift is for innovation to be taken over more and more by third-party channel partners", says Mr Yacura (see box). Suppliers will voluntarily fund an increasing amount of research and development in order to obtain a franchise on the standard design and thereby protect their competitive position with higher switching costs.

Cometh the hour, cometh the knowledge worker

Increased collaboration will be a defining feature of the company of 2020. Whether it's suppliers interacting with vendors, salespeople with customers, employees with each other, or companies with their partners, high-quality relationships with outside parties will become more important as a source of competitive advantage between now and 2020. Executives expect to see a lot more collaborative problem-solving inside and outside their firms, and clear majorities intend to create employee incentives to encourage collaboration across functions (79%) and with external stakeholders (68%).

Some of these interactions can be boiled down to sets of routines and rules; some can be automated. But the real focus of management attention will be on

Vendor, vidi, vici

For Blyth, Inc, a US$1.6bn US designer and marketer of home decorative and fragranced products such as candles, international markets outside of North America and Europe will only have limited potential for some time to come owing to the typical nature of consumer household décor buying behaviour in many of those markets. Its discretionary household products are targeted at middle class and higher consumers, and the core base is and will remain in the developed countries.

So it will need to compete in markets that it knows will become increasingly saturated and more competitive. What will be its recipe?

Bruce Crain, senior vice-president, describes his strategy as having three prongs: product excellence, power branding and world-class global supply chain management. By leveraging these competencies and ensuring a presence in all major channels—direct sales, catalogue sales, Internet sales and wholesale—the company will be positioned for continued market share growth in otherwise flat markets, says Mr Crain.

Its strategic emphasis on product strength and branding is nothing new to the consumer packaged goods (CPG) industry. All CPG firms will need strong products as a foundation, and on top of that they will need strong global brands to mitigate the risk of customers buying direct from Asian suppliers. "It keeps you from being dis-intermediated by the Wal-Marts of the world", says Mr Crain.

CPG firms will also need to deliver their products through world-class, low-cost supply chains, or else the retailers will do it for them. "They manage your economics", says Mr Crain. "They look at your bill of materials and help you buy materials better. They'll tell you to use the Trans-Siberian Railroad instead of a containership via the Pacific if that can help both of you."

But Mr Crain also sees a different variety of supply chain management emerging in the future. Blyth's recipe for differentiated supply-chain management involves stimulating creative collaboration with its suppliers so they add "design power, not just less expensive arms and legs".

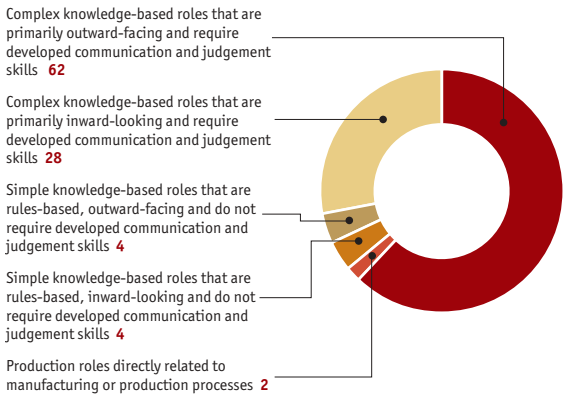
For Blyth, the long-term future of supply-chain management will be more about product innovation through suppliers than about logistics; more about ensuring product availability than about reducing costs; as much about the flexibility to ramp up production and distribution rapidly when demand grows, as about traditional goals of high asset utilisation and low operating costs.

the processes, people and relationships that are hardest—and least desirable—to automate.

The vast majority of business leaders believe that complex knowledge-based roles will have become their most valuable source of competitive advantage by 2020. By contrast, production and simple knowledge-based roles will have a relatively low impact on competitive advantage, and survey respondents expect their number to decrease over the next 15 years, thanks to automation and outsourcing.

Management skills, interpersonal skills and problem-solving skills are seen as the most important qualities for employees over the next 15 years. Survey respondents believe these skills are particularly important in areas such as customer service, strategy and business development and knowledge management, where personal chemistry or creative insight matter more than rules and processes. Improving performance in these areas, the provinces of the knowledge worker, will be a major boardroom preoccupation from now through to 2020.

Which of the following types of role will be most valuable to your organisation as a source of competitive advantage in 2020?
(% respondents)



Source: Economist Intelligence Unit survey, 2005.

Technology's new challenge

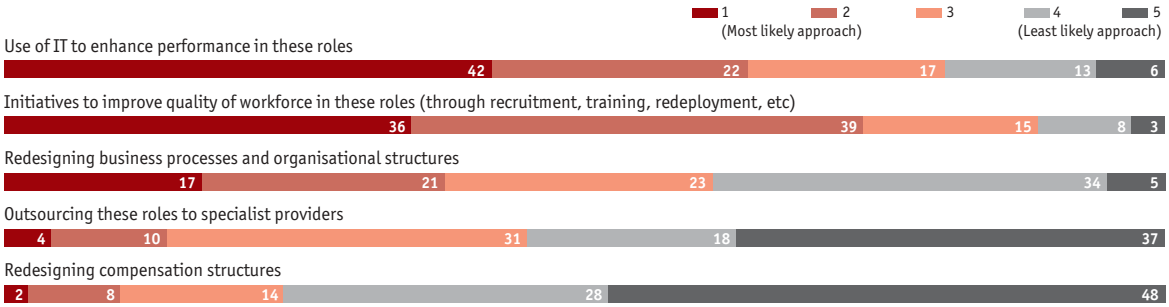
Executives in the survey group regard technology as the single best way to increase performance in this area. Whereas the focus of IT investment in the past has been on improving administrative efficiency, says Andy Kyte of Gartner, in future such investment will increasingly focus on increasing the efficiency of knowledge workers.

Indeed, by 2020 investment in such technology is expected to dominate IT budgets, since infrastructure requirements (automation of basic administrative processes, connectivity, security and so on) will have been met. Business leaders regard improvements in the technology of knowledge management as the most promising means of improving productivity over the next 15 years. So what sort of tools and technologies will knowledge workers be using by 2020?

Whereas manual work is often based on routine and repetition, knowledge work provides competitive advantage precisely because it involves creativity, innovation and decision-making, all of which are very difficult to automate. Supporting knowledge workers as they perform such non-routine tasks requires a mix of new "knowledge management" tools that are only just starting to emerge. These technologies are concentrated in three areas: new collaboration and communication tools; new ways to store, filter and retrieve unstructured data; and decision-support tools that expand and enhance knowledge workers' abilities.

The need for new ways to collaborate and communicate is the most immediately apparent. "All the IT organisation has delivered to non-routine cognitive workers in the past 40 years is e-mail, which provides a highly questionable productivity gain for most of them", says Mr Kyte. "It's a very poor tool for collaboration." Many knowledge workers find themselves overwhelmed and distracted by incoming messages. But e-mail is, at the same time, the chief conduit of information between knowledge workers. What is needed instead are new tools that are more

How will your organisation seek to improve its performance in roles that require developed communication and knowledge skills?
Rank in order, where 1=most likely approach and 5=least likely approach.
(% respondents)



Source: Economist Intelligence Unit survey, 2005.

closely attuned to distributed, team-based working practices. Such tools are already in use, at least in some industries.

Pharmaceutical companies, for example, are using "eRoom" software that gathers all the documents, discussion threads and plans associated with a particular research project into a single virtual workspace. Engineering firms, meanwhile, are adopting "product lifecycle management" software, an outgrowth of computer-aided design systems, which makes it possible for thousands of suppliers to collaborate efficiently on the design and construction of large, complex systems, such as aircraft.

Remote technologies are being put to work in fields as diverse as healthcare, enabling physicians to make clinical diagnoses at a distance, and energy. "Today, our customers can remotely run equipment, monitor downhole conditions in real time, and make faster, better decisions based on stronger data", says Dave Lesar, president and CEO of Halliburton, an oil and gas services company. "They need fewer knowledge workers, because an engineer can manage multiple jobs simultaneously from virtually anywhere in the world, instead of travelling to each well site."

These tools have been adopted first in specific vertical industries, but similar collaborative features are starting to filter across into other industries (such as consumer goods) and into standard desktop software (such as Microsoft's Office suite).

The second area in which new tools are starting to emerge relates to the handling of unstructured data such as free-form text, which is currently far harder for knowledge workers to access and manipulate than structured data such as sales figures, inventory levels and so on. Google and other search engines have demonstrated the benefits of being able to summon up unstructured information at will from the Internet; so imagine the benefits of being able to find things just as easily within a company's own network. A researcher may be interested in the answer to a question that a co-worker in another office has already worked out, for example. Creating a communal repository of documents is the first step towards this kind of enterprise-wide search. But there is no point in having such a system unless a culture of collaboration and sharing has already been established, says Mr Kyte.

But once these foundations are in place, it becomes possible to deploy the third and most speculative type of technology: systems that combine information from collaboration spaces, structured databases and unstructured data sources to provide decision-support functions, and even some degree of automation, to knowledge workers. This is still a long way off, and starts to veer towards the much-maligned field of "artificial intelligence". But there are already some signs of progress in this direction.

Marketing departments can now combine their own sales figures with customer feedback from public web forums to evaluate the success of a particular campaign, for example, or uncover latent demand for a new product. In Australia, lawyers are using a system that compares the details of a divorce case against previous rulings, to determine the most likely outcome and encourage an out-of-court settlement. And share trading is routinely done by semi-automated systems that follow rules provided by their human masters; such "robotraders" enable fund managers to concentrate on the big picture, rather than on the mechanics of individual trades.

Such robots do not replace humans, but amplify their abilities. This sort of thing represents "the bleeding edge of innovation", says Mr Kyte, and is still 10-15 years away from widespread deployment.

Even if all these emerging technologies were ready for mainstream use today, other hurdles would still remain. At the moment, all of this new software is still being delivered in an old-fashioned, piecemeal fashion. New ways must be developed to combine pieces of software in flexible ways to suit the working practices of different types of knowledge workers in different industries. Concerns such as data security, compatibility, cost and a lack of appropriate skills will also have to be addressed.

By 2020, knowledge workers may well find themselves sitting at the intersection of multiple collaborative workspaces; plucking needles from enterprise-wide haystacks; and being supported by teams of "software robots" that make them more productive—just as manual workers on assembly lines are assisted by power tools and robots today. These workers of the future are also likely to be sitting in organisations with very different structures.

What are the most significant barriers to improved relationships with customers, suppliers and other external parties that your organisation faces?
(% respondents)

Source: Economist Intelligence Unit survey, 2005.

Power to the people?

Companies will be subject to a variety of centrifugal forces over the next 15 years. Outside suppliers will reach more deeply into companies' internal processes, increasing external dependencies. Revenue will become more diversified across new geographic markets, as will customer preferences. Customers will expect personalised service and will put a premium on the quality of local relationships. Employees will be spread across more territories and a clear majority of executives expect an increase in the number of remote workers spending at least one day a week outside the office.

Head office will look less uniform too: managers from emerging markets will not only displace expatriate managers in multinational firms in their own countries, as they already do today, but will begin to fill high-level positions in corporate headquarters in the developed world.

All of these forces point to the erosion of hierarchical or centralised corporate structures. Two-thirds of the survey respondents say they will give their employees greater autonomy to make important decisions; almost as many agree that there will be fewer layers of management between the CEO and the

BT: A glimpse of the future?

BT, which privatised in 1984, a good ten years ahead of many of its continental rivals, has a reputation for having gone further than other European former telecoms monopolies in restructuring its operations. The company is striving to create an environment that is very far from the bureaucratic and technical monopoly of old. BT may not know exactly what it will be selling in fifteen years time, but it has an idea how it will be selling—via a break-up of its current employee structure into relatively small competing components.

"Over the next 15 years the company expects to see organisations fragment in response to globalisation and competition", says Andy Green, CEO of BT Global Services, whose division employs one-third of BT's total workforce. As a result, explains Mr Green, more employees will work in groups of between 10 and 100 people and compete with each other to sell their knowledge and services into the larger organisation. The idea is that this new structure will allow BT better to pinpoint and motivate top-performers. "It's all moving towards the sense of what you do with core employees", says Mr Green, adding that there will be much less emphasis on technical product skills.

Those technical people that remain will have to be more nimble than before in order to keep up with an increasing pace of technological advance. Indeed, since technical development can be done anywhere in the world, few hard-core developers are likely to remain on BT's staff, or in Europe. Over the next 15 years BT expects to seek a larger proportion of its research and development requirements overseas, particularly from Asia. "Why not [tap into the] world market …[and] buy geek skills over the Net?" asks Mr Green.

The employees that will be hard to outsource will be those that can manage customer projects and relationships or provide local marketing knowledge such as a detailed understanding of how British 70-year-olds think about the world, says Mr Green. In addition network operators will always need people to dig roads and hook up physical networks. But lots of people in between those facing customers and those laying networks will disappear.

"Internal IT is the biggest thing. It's clear much would be done better in India in a lower-cost economy," says Mr Green. So BT is pulling employees out of the server room and retraining them to deal with end-customers. "It's a massive change", explains Mr Green, whose division is in the process of retraining thousands of employees to provide IT services to its business customer base.

BT begins by assessing its employees' communication abilities. It is not enough to measure which employees are articulate and pleasant; even those who show a natural aptitude for dealing with people do not necessarily want to go to a customer's site and troubleshoot. "Some people like to work in labs and solve problems. They may have the skills to work on a customer premise and be friendly but they don't have the willingness", admits Mr Green.

BT not only teaches its employees softer relational skills—it also asks them to learn to sell themselves and compete with each other. Rather than reporting to a single line manager, employees form large, flexible pools, from which managers draw them to work on specific projects. In addition, each member of staff is assigned a career manager, who is responsible for ensuring their skills are kept up-to-date and marketable.

This turnaround has proved particularly challenging for managers, who could typically expect to judge their standing and organise their work according to the number of employees they have reporting to them. "People have to learn to live with the idea that they are on this or that project. That's massive for managers who have the idea that if I don't have people reporting to me I can't do the job", says Mr Green." Managers themselves are also expected to shift roles. BT has a policy of changing managers' responsibilities regularly and removes managers from projects that have become stuck in a rut.

most junior employee by 2020. Some believe that the partnership model used in professional services firms is a blueprint for the future, with decision-making power dispersed among many senior people.

Greater employee participation in decision-making, through mechanisms such as decision markets, will become more prevalent. In his recent book "The Wisdom of Crowds", James Surowiecki cites an experiment at Innocentive, a drug company, in which a diverse group of employees were given information on six drugs and asked to identify which would win regulatory approval and which would be rejected. The company already knew that three of the six drugs would be waved through and three would not. Sure enough, employees bought the winners and sold the losers.

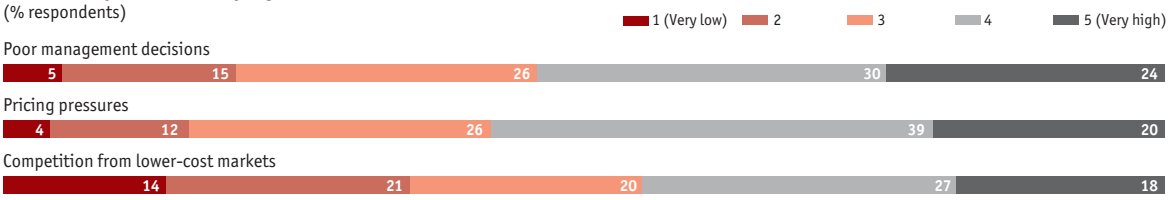
Milestones and metrics

None of this is to downplay the importance of management. Quality of management runs throughout the survey results as one of the primary determinants of success or failure—71% of respondents see it as a very important enabler of increases in growth rates, far ahead of any other factor, and poor management decisions are perceived as the single most critical risk to companies between now and 2020.

What constitutes successful management will change, however. "The most important contribution of management in the 20th century was the fifty-fold increase in the productivity of the manual worker in manufacturing", wrote Peter Drucker, the great management thinker who died in November 2005. "The most important contribution management needs to make in the 21st century is similarly to increase the productivity of the knowledge worker." Such productivity, he declared, is now the key to competitive strength and economic achievement.

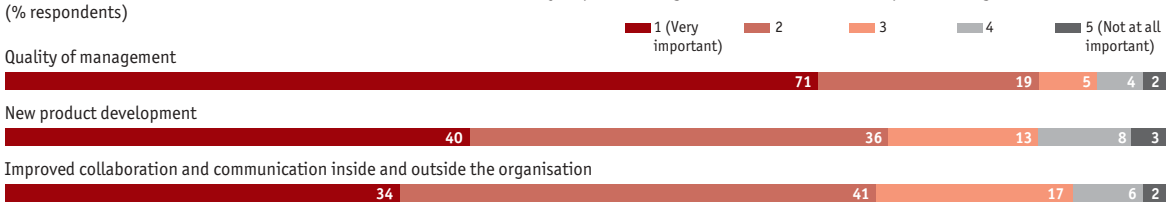
Improving the productivity of knowledge workers has proved far more difficult than expected, however. Whereas the output of a manual worker can be measured in units per hour, measuring "ideas per minute" or "e-mails per day" for a knowledge worker gives little indication of actual productivity. As a result, it is still unclear what kinds of approaches are most effective at

In your view, how threatening are the following risks to your company between now and 2020? Rate each risk on a scale of 1 to 5, where 1=very low and 5=very high.
(% respondents)



Source: Economist Intelligence Unit survey, 2005.

In your view, how important are the following factors in enabling your company substantially to increase its growth rate between now and 2020? Rate each factor on a scale of 1 to 5, where 1=very important to growth and 5=not at all important to growth.
(% respondents)



Source: Economist Intelligence Unit survey, 2005.

boosting the efficiency of knowledge workers. It is also difficult to design compensation structures that provide the correct incentives for high performance.

Some companies are already taking steps to measure and manage so-called "right brain" thinking. Procter & Gamble is emphasising creativity by using outside consultants to help the company focus on how customers feel about the whole experience of using the product, more than on improving the features of the product itself. General Electric is implementing a process called CENCOR (Calibrate, Explore, Create, Organise, and Realise) to structure and improve the creative process.

Most industry observers suspect that these examples are early examples of a long and significant trend toward creative management. "You need a process that evaluates the creative thoughts that flow freely through the company", says Mark Miranda of Georgia Pacific. "An insane asylum has lots of creative ideas, but you have to have an evaluation process and managerial discipline to create a meritocracy of ideas."

"Exactly how to improve knowledge-work productivity is one of the most important economic issues of our time", observes Thomas Davenport, a management thinker, in his recent book "Thinking for a Living". Companies that begin to grapple with this challenge now will be best placed to seize the opportunities of the future.

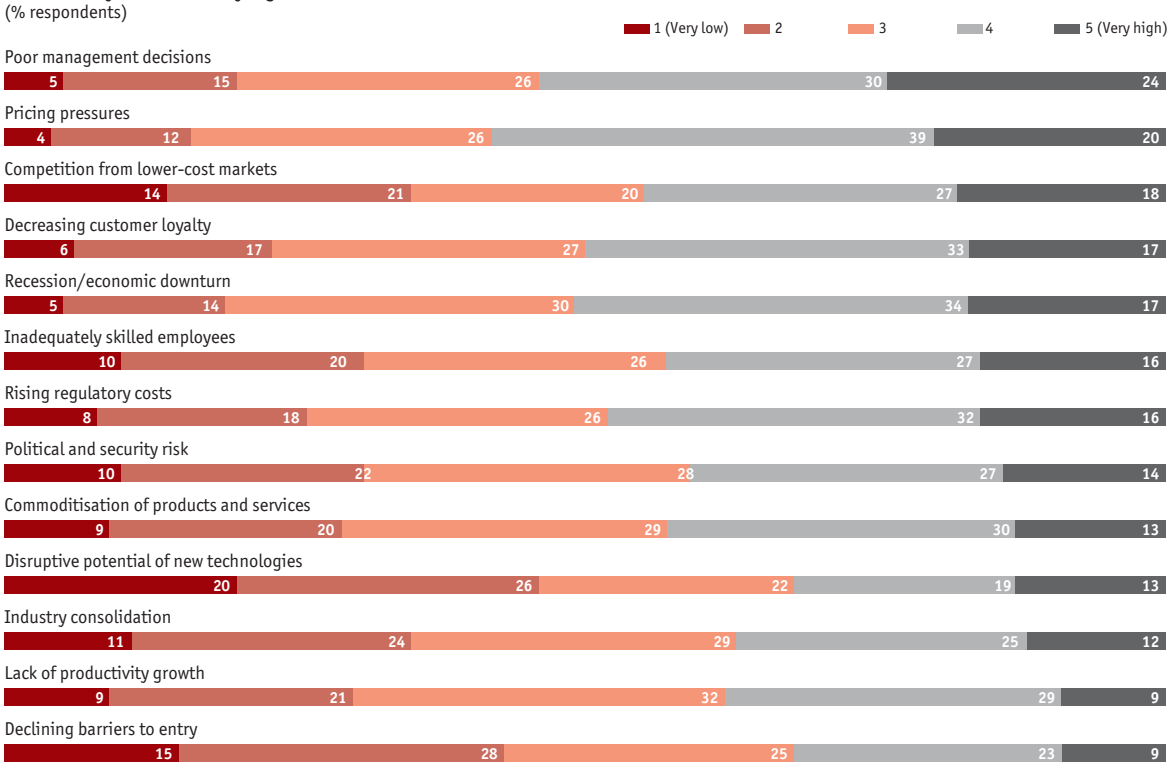
Appendix I: Survey results

Foresight 2020 Economic, industry and corporate trends

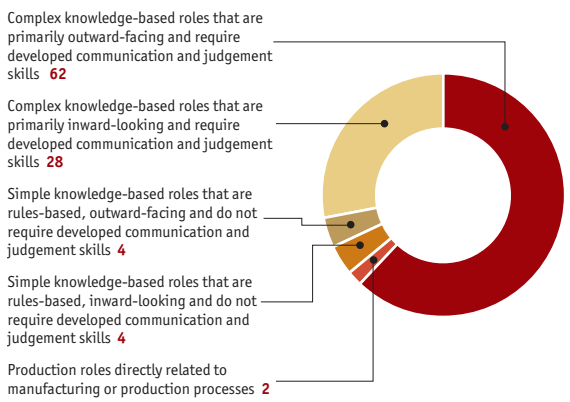
A total of 1,656 executives participated in the Economist Intelligence Unit's online survey in November and December 2005. We would like to thank all of them for their time and insights.

Please state whether you agree or disagree with the following predictions about the external environment over the next 15 years.
(% respondents)

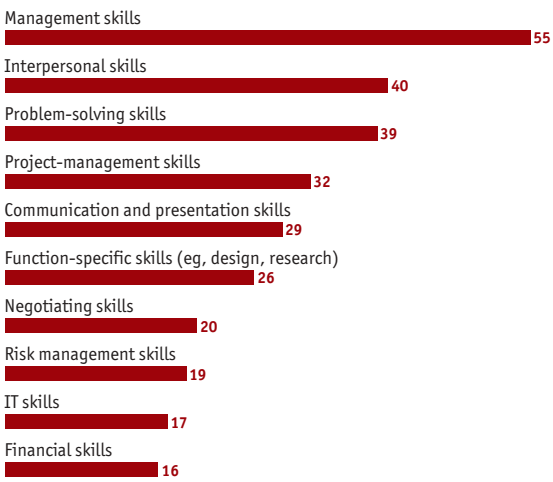
In your view, how threatening are the following risks to your company between now and 2020? Rate each risk on a scale of 1 to 5, where 1=very low and 5=very high.
(% respondents)



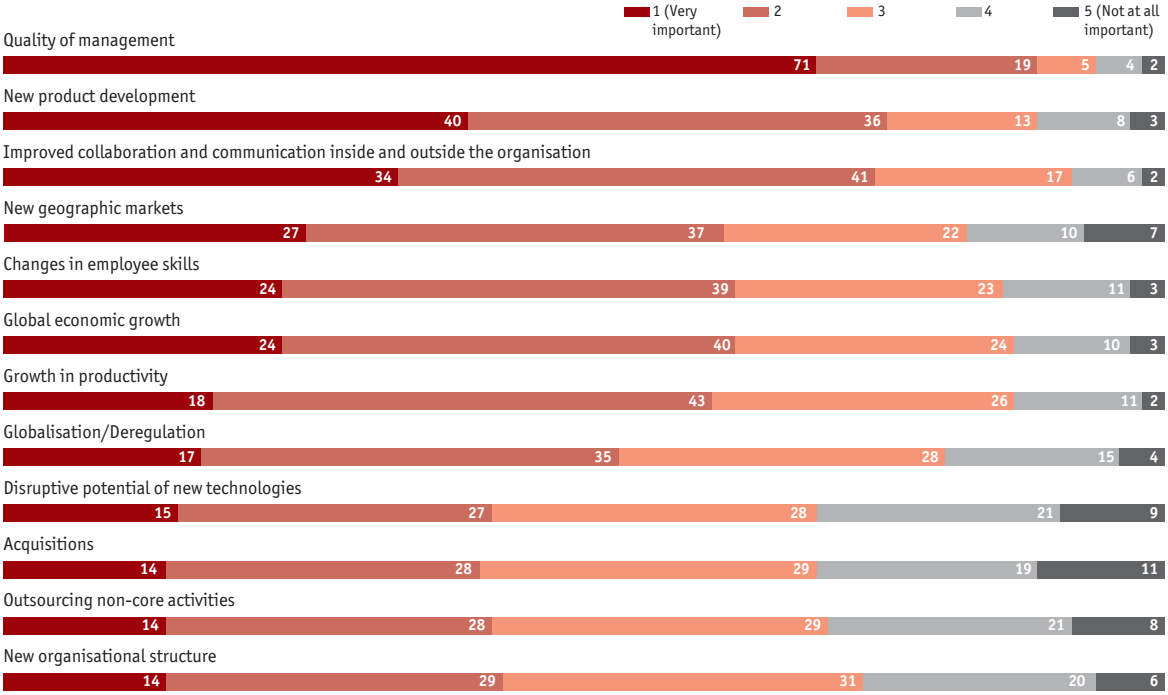
Which of the following types of role will be most valuable to your organisation as a source of competitive advantage in 2020?
(% respondents)



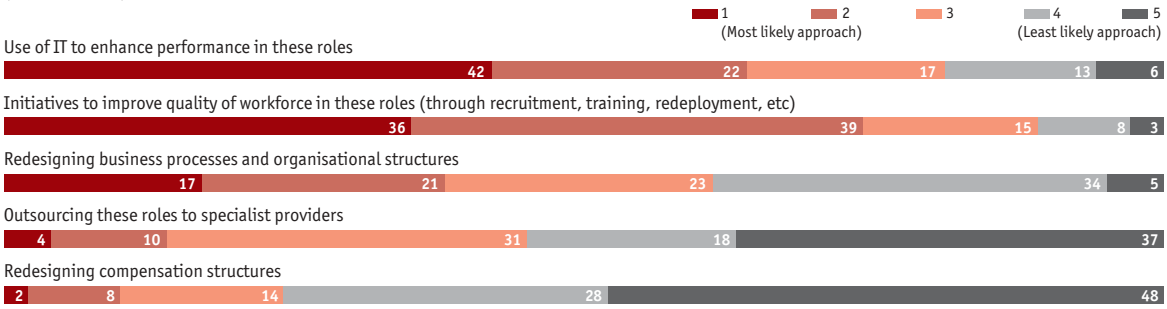
Which skills will be most important to your organisation's success over the next 15 years? Select up to three options.
(% respondents)



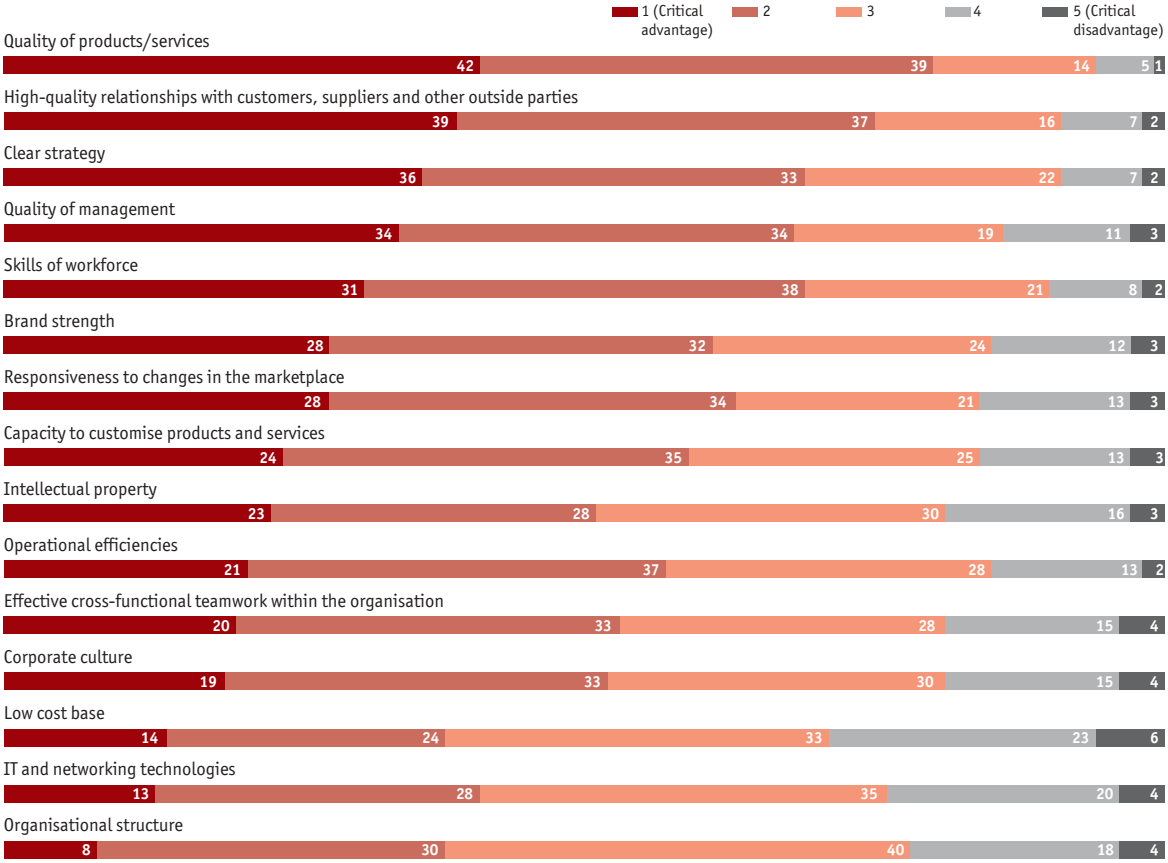
In your view, how important are the following factors in enabling your company substantially to increase its growth rate between now and 2020? Rate each factor on a scale of 1 to 5, where 1=very important to growth and 5=not at all important to growth.
(% respondents)



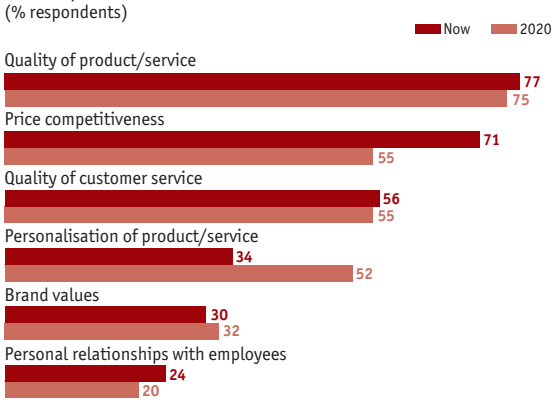
How will your organisation seek to improve its performance in roles that require developed communication and knowledge skills? Rank in order, where 1=most likely approach and 5=least likely approach.
(% respondents)



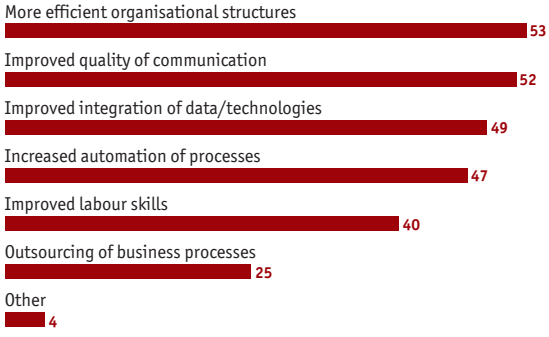
Where do your sources of competitive advantage currently lie? Rate each on a scale of 1 to 5, where 1=critical source of competitive advantage and 5=critical source of competitive disadvantage.
(% respondents)



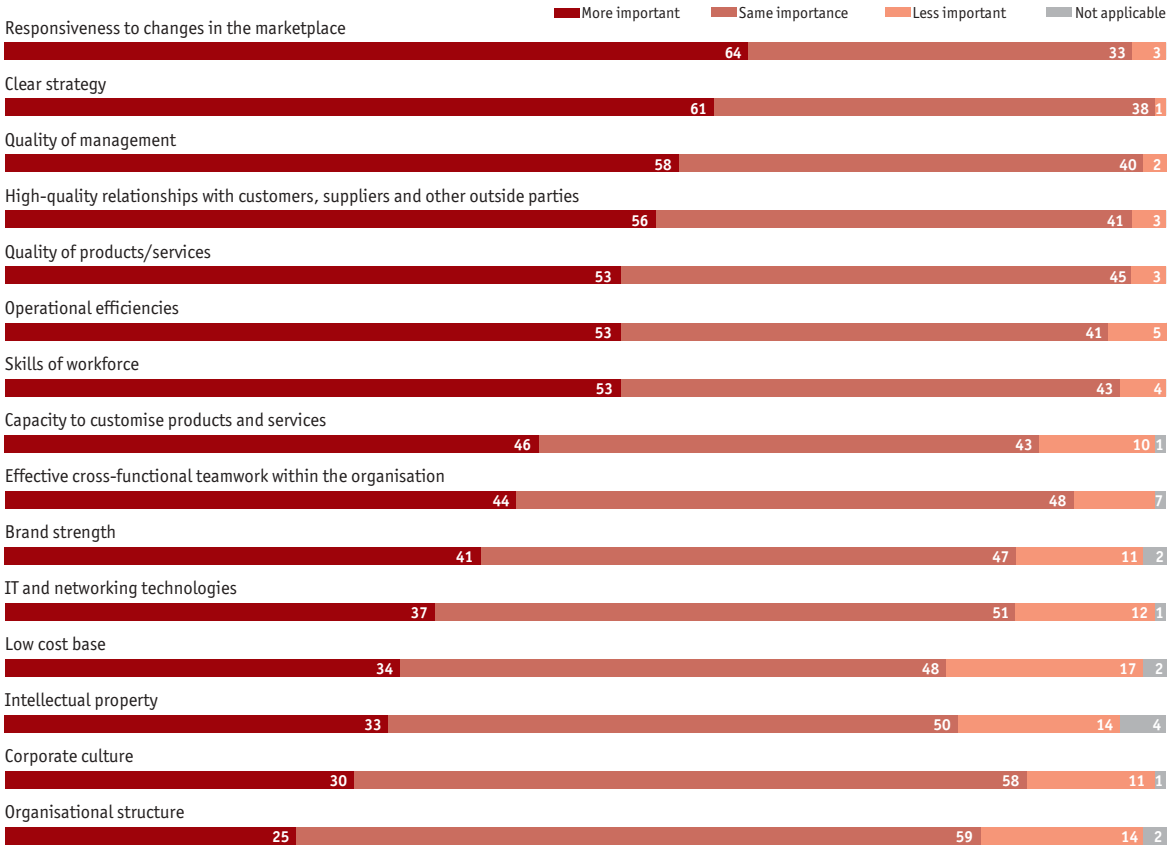
Which of the following is most important to your customers now, and which will be most important in 2020?
Select up to three items.
(% respondents)



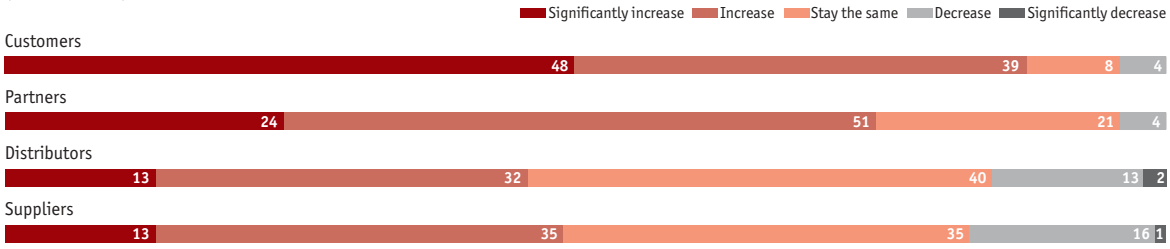
What are the most significant barriers to improved relationships with customers, suppliers and other external parties that your organisation faces?
Select up to three options.
(% respondents)



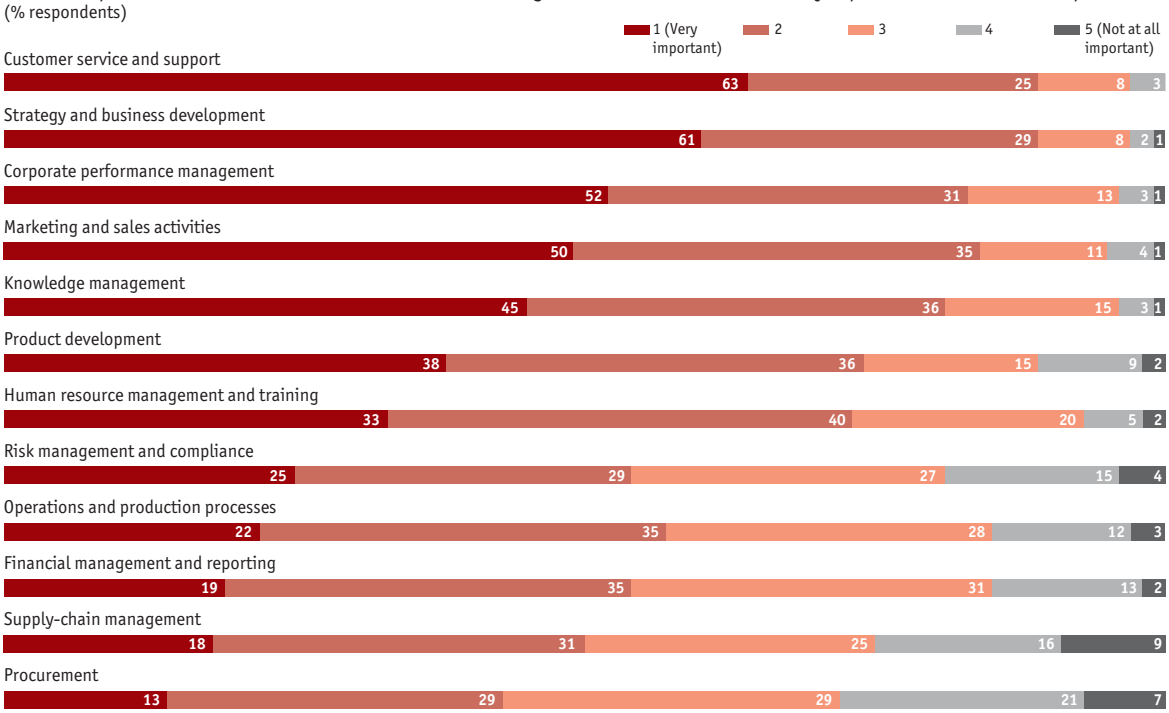
How will your sources of competitive advantage change over the next 15 years? Please say whether you think each of the following will become more or less important to your organisation between now and 2020.
(% respondents)



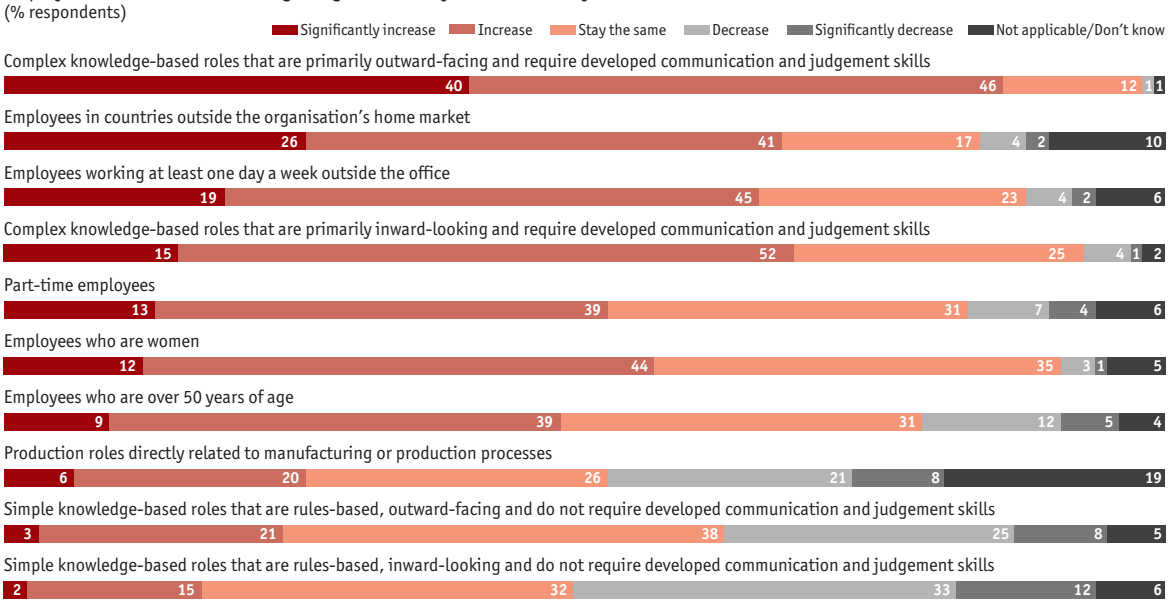
What change do you expect in the numbers of external parties that your organisation interacts with over the next 15 years?
(% respondents)



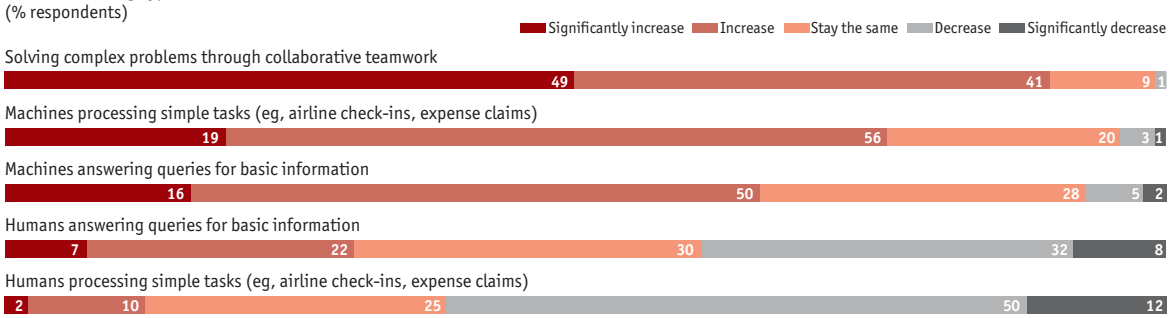
How important are complex interpersonal interactions (ie, relationships that require developed judgement and communication and are difficult to automate) to the performance of your organisation in the following areas of activity?
Rate the importance of such interactions to each of the following on a scale of 1 to 5, where 1=very important and 5=not at all important.
(% respondents)



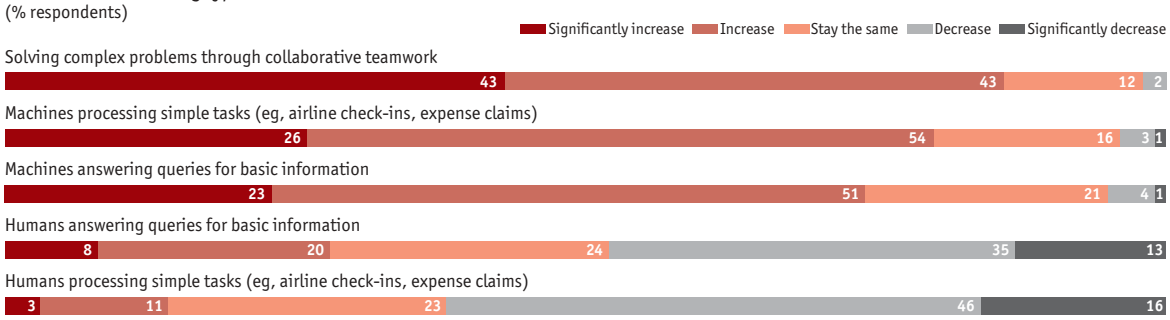
How do you expect your workforce to change over the next 15 years? Please indicate whether the proportion of your organisation's employees in each of the following categories is likely to increase, stay the same or decrease.
(% respondents)



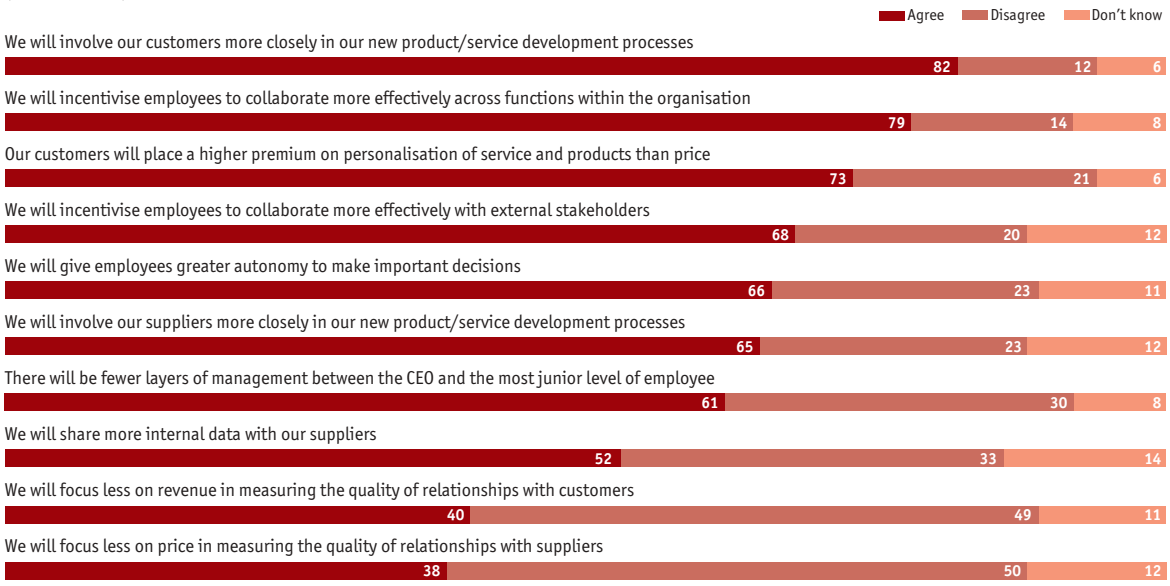
How will communication within your organisation change over the next 15 years? Please state what changes you expect in the volume of the following types of interactions between now and 2020.
(% respondents)



How will communication outside your organisation change over the next 15 years? Please state what changes you expect in the volume of the following types of interactions between now and 2020.
(% respondents)

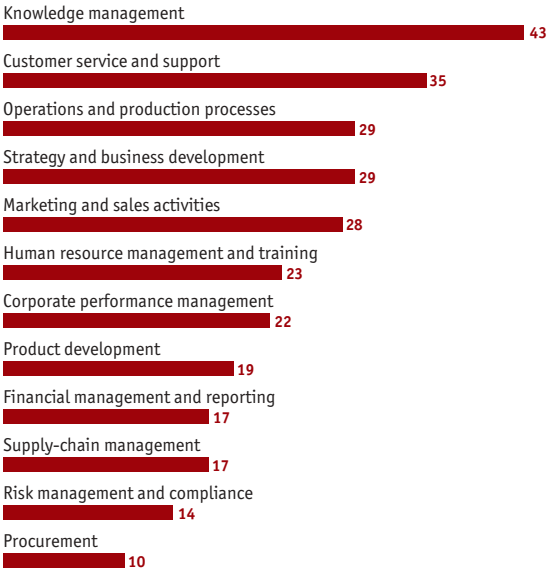


How do you expect the following aspects of your organisation to change over the next 15 years? Please state whether you agree or disagree with these statements about your organisation in 2020**.**
(% respondents)

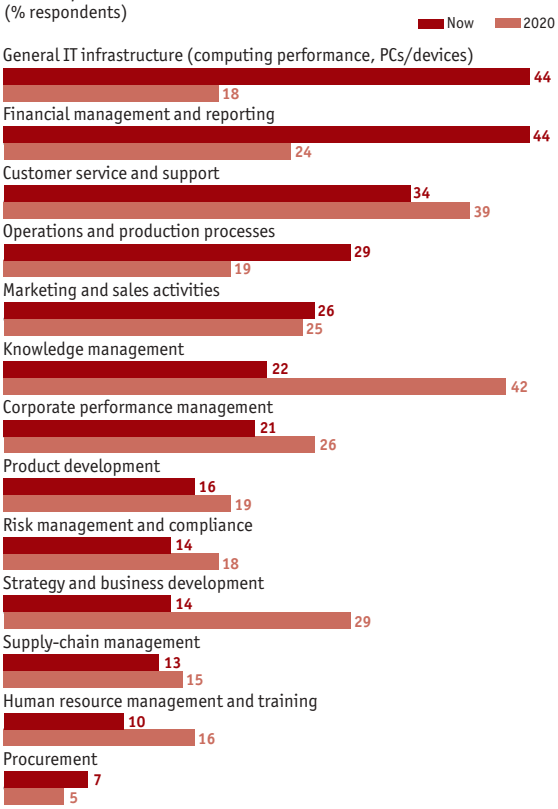


What are the most significant barriers to improved relationships with customers, suppliers and other external parties that your organisation faces?
(% respondents)

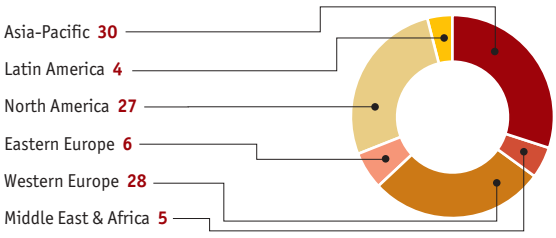
Which of the following areas of activity offer the greatest potential for productivity gains over the next 15 years?
Select up to three activities.
(% respondents)



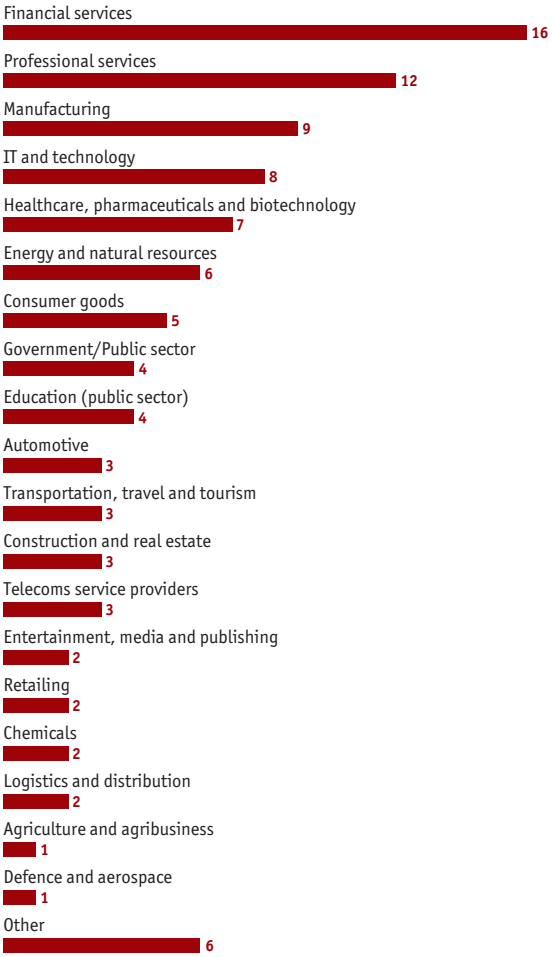
What are the top three areas of focus for IT investment at your organisation now, and what will be the top three areas of focus over the next 15 years?
Select up to three activities.
(% respondents)



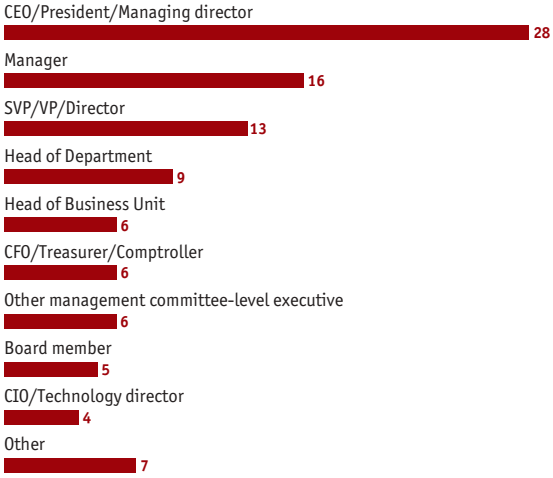
In which region are you personally based?
(% respondents)



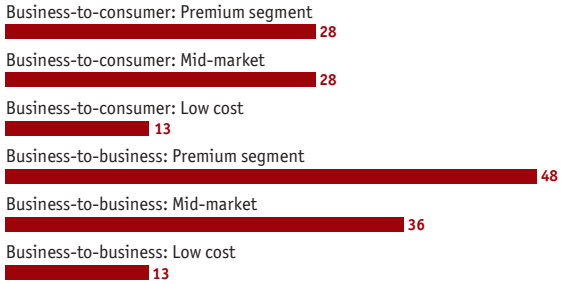
What is your primary industry?
(% respondents)



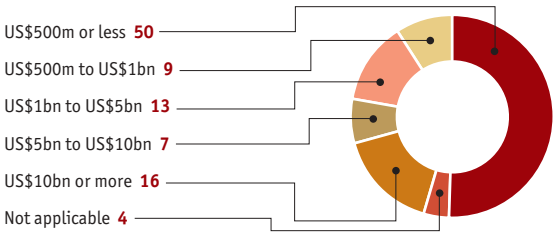
Which of the following best describes your title?
(% respondents)



What is the nature of your target market?
Select all that apply.
(% respondents)



What were your company's global revenues in US dollars in 2004?
(% respondents)



Appendix II: Methodology for long-term forecasts

The main building blocks for the long-term forecasts of key market and macroeconomic variables are long-term real GDP growth projections. The Economist Intelligence Unit has estimated growth regressions (based on cross-section, panel data for 86 countries for the 1970-2000 period) that link real growth in GDP per head to a large set of growth determinants. The sample is split into three decades: 1971-80, 1981-90 and 1991-2000. This gives a maximum of 258 observations (86 countries for each decade); given missing values for some countries and variables, the actual number of observations is 246. The estimation of the pooled, cross-section, panel data is conducted on the basis of a statistical technique called Seemingly Unrelated Regressions.

The determinants of growth consist of the scope for convergence (based on initial GDP per worker at the start of a period); demographic variables; a set of policy variables (measuring the fiscal stance, openness to trade, and the government regulatory burden in product, credit and labour markets); a measure of institutional quality; geography (climate, location and the degree of primary export orientation); education levels and labour quality (as measured by mean years of schooling and life expectancy); the external economic environment (changes in the terms of trade); the level of development of information and communications technology (ICT); and historical legacies (history of independent statehood).

The regressions, which have high explanatory power for growth, allow us to forecast the long-term growth of real GDP per head to 2020, on the basis of demographic projections and assumptions about the evolution of policy variables and other drivers of long-term growth.

Definitions of variables

The dependent variable is GDPG: Average annual growth in real GDP per head, in the 1970s, 1980s and 1990s, measured at national constant prices.

The **independent variables** include:

LnGDPPL: The natural logarithm of GDP (adjusted for purchasing power parity—PPP) per worker (that is, per population aged 15-65) in constant 1980 US dollars at the start of each decade. Expressed as an index, US=1.

LnSCHOOL: The natural logarithm of the mean years of schooling of the population aged over 15 at the start of each decade. Missing values for some countries are filled in by estimating mean years of schooling on the basis of an equation relating mean years of schooling (where available) to gross primary school enrolment ten years previously, and to secondary and tertiary enrolment ratios five years previously.

LnLIFEEXP: The natural logarithm of life expectancy at birth at the start of each decade. This variable also enters the equation in squared form, reflecting diminishing returns to growth of increases in life expectancy at high levels.

OPEN: Updated Sachs-Warner index of openness—the fraction of years during each decade in which a country is rated as an open economy according to the following four criteria: (1) average tariff rates below 40%; (2) average quota and licensing coverage of imports of less than 40%; (3) a black-market exchange-rate premium that averaged less than 20%; and (4) no extreme controls (taxes, quotas, state monopolies) on exports.

INST: Index of institutional quality (on a scale of 1-10) that is an average of five sub-indices of measures of the rule of law, quality of the bureaucracy, corruption, the risk of expropriation and the risk of government repudiation of contracts. Forecast values are based on corresponding indicators from our business environment rankings.

LABPOP: The difference between the growth rate of the working-age population (aged 15-65) and the growth rate of the total population in each decade in the 1970-2000 period.

TOT: The average annual rate of change of the terms of trade in a given decade.

GOVSAV: The average government savings ratio in each decade (current government revenue minus current government expenditure) expressed as a share of GDP.

TRADESH: The average share of trade (exports and imports of goods and services) in GDP, lagged by one decade to deal with the endogeneity of growth and trade.

GOVREG: An index on a scale of 1-10 of regulation of product, credit and labour markets. For forecast periods, the composite index is based on seven indicators from three categories of our business environment rankings model—from Policy towards private enterprise (ease of setting up new businesses, freedom to compete, price controls); from Financing (openness of the banking system, financial market distortions) and from Labour markets (restrictiveness of labour laws, wage regulation).

LnICT: The natural logarithm of an index, on a scale of 1-10, of the development of information and communications infrastructure. ICT development is found to influence growth

significantly only from the 1990s, with little or no impact in previous decades. For 1990 the index is measured simply on the basis of fixed telephone lines per 1,000 population. From 2000 a more sophisticated measure is constructed, reflecting the very rapid development of ICT. The composite ICT index is based on ten indicators. Six indicators are quantitative and rely on our forecasts of fixed-line telephone penetration (lines per 100 population); mobile telephone penetration (subscribers per 100 population); the stock of personal computers (PCs per 100 population); Internet users (per 100 population); the number of Internet servers (per million population); and broadband penetration (per 1,000 population). In addition, there are four qualitative indicators from our "e-readiness" model. These include the quality of Internet connections, the development of e-business, the development of online commerce and the exposure of the population to the Internet ("Internet literacy"). Each of the ten indicators is transformed into an index scaled 1-10. The composite ICT infrastructure/use index, on a 1-10 scale, is an average of the ten component indices.

Control variables include **PRIMARY**: Share of the exports of primary products in GDP at the start of a decade; **TROPIC**: Percentage of the land area within a country that has a tropical climate; **COLONY**: History of independent statehood—a dummy variable taking the value of 1 if a country was a colony before 1945; and, in some specifications, regional dummy variables.

Productivity growth

The forecasts of GDP growth, of capital stock growth (based on estimated investment shares and assumed depreciation rates) and of growth in labour supply (based on projections of working-age population and assumptions on labour force participation) yield labour productivity growth and total factor productivity growth forecasts. The latter utilise the growth accounting identity, GY=b*GK+c*GL+A, where GY is growth of real GDP, GK growth of the capital stock and GL growth of human capital (the labour force adjusted for changes in skills). "A" stands for growth in total factor productivity; "b" and "c" are the shares of capital and labour in income. Trade values are forecast on the basis of simple import (function of GDP and relative prices) and export functions. Forecast market exchange rates (that is, the differential between PPP and market exchange rates) depend on the differential in labour productivity growth between a country and the US.

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