Business in the Information Age:
The International Benchmarking Study 2004

Businesses in the UK are deploying information and Communication Technology (ICT) more pervasively and innovatively than ever before. We now see employees on the move quite at ease accessing company systems on their laptops through wireless connections, and more broadly, businesses are ever more integrated in their exchange of product, schedule, and financial information. Ours is truly an electronic world.

Our report this year contains much good news for business use of ICT in the UK: there are signs that the digital divide between large and small businesses is closing, with the UK's micro and small businesses showing significant gains in the uptake of websites and trading online. The UK has also become a leader in the deployment of some important new technologies such as wireless LANs and Voice over IP. Moreover, the level of ICT deployment by UK businesses has become more sophisticated versus their peers in other nations.

Globally, there are some new trends emerging: this year, we see that businesses in the UK and elsewhere are increasingly selective in their deployment of ICT. Businesses are now much more astute in measuring the benefits of ICT, and are consequently focussing on those areas where ICT make a real difference to the bottom-line. It is no longer ICT for ICTs sake; this year, discriminating and selective application of ICT has become the dominant theme.

I'm pleased that this report continues on its own path of innovation. For this first time, the report examines *sectoral* differences in the adoption and use of ICT. This will not only deepen the reader's understanding of the broad trends identified, but will enable businesses and policy makers to direct future efforts with greater precision.

The DTI remains committed to ensuring that UK businesses can harness the power of ICT to support communications, commerce, and innovation. I commend this report to all in business and government communities who share these goals.

Mike O'Brien MP
Minister of State for Energy
e-Commerce and Postal Service

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1. Introduction

This is the eighth International Benchmarking Study

- The Department of Trade and Industry's International Benchmarking Study (IBS) 2004 is the eighth in a series dating back to 1997, reporting on the findings from a survey of business use of Information and Communication Technology (ICT) undertaken each year. Originally conceived as a study to measure some of the more basic aspects of technology adoption, the IBS now focuses not only on which ICTs are being adopted, but also increasingly on how ICT is being effectively deployed.
- The link between effective use of ICT and productivity is incontestable. For the UK Government therefore, understanding how businesses in leading economies are utilising ICT, and benchmarking the UK against these economies, has assumed even greater importance. The IBS provides a crucial insight into international activity in ICT, giving not only a snapshot of the current situation, but also allowing emerging trends to be identified. The study therefore provides a useful basis for informing all e-business policymakers in the UK.

- As in prior years, the IBS 2004 is based on survey data of businesses in the participating countries. This year, business and ICT professionals in nearly 8,000 businesses - 2,716 in the UK and 500 in each of 10 other countries - were contacted and asked to respond to questions on ICT usage, plans, and sentiment within their businesses.
- The eleven countries surveyed were the UK, Australia, Canada, France, Germany, Italy, Japan, the Republic of Ireland, South Korea, Sweden and the USA.
- The survey sample was drawn from representative sets of businesses of all sizes from eight sectors: Primary Industry, Manufacturing, Construction, Retail/Wholesale, Transport and Communications, Finance, Services, and Government.
- The reliance on primary data is one of this study’s greatest strengths. As with all sample surveys, the results for the study are subject to the constraint that they are only accurate to within a certain percentage (in this case, +/- 3% for the UK, and +/- 5% for other countries). This margin of error makes absolute precision in the magnitude of trends occasionally difficult to obtain. We strive in this report to respect the limitations of the survey technique, while drawing out the rich detail and nuanced insights at which this type of study excels.
- There are significant sector differences across the country samples, reflecting structural differences in the economies of each nation. The manufacturing sectors of Japan and Korea are almost twice as large (proportionately) as those of the UK and Australia, for example. The differences are real and should be borne in mind when interpreting results.

This is the eighth International Benchmarking Study (cont'd)

- The survey itself was conducted from April to July 2004. All questions were asked in the native languages of those responding to the interviews. HI Europe used its Computer Assisted Telephone Interviewing (CATI) package to conduct telephone interviews.
- The UK survey sample was spread evenly over the nine English regions and Scotland, Wales, and Northern Ireland, except where samples were supplemented in Northern Ireland. Details of the questionnaire, sample sizes, response rates, and methodology are provided in the appendix available electronically at www2.bah.com/dti2004 or www.dti.gov.uk.
- The size bands adopted for this year's study are, as in the previous four years:
  - Micro businesses 0-9 employees
  - Small businesses 10-49 employees
  - Medium businesses 50-249 employees
  - Large businesses 250+ employees.
- As in previous years, the survey results have been weighted to reflect employee distribution. Thus data referencing, for example, "30% of businesses" should be understood to mean "businesses accounting for 30% of all employment in that country". Weighting by employment takes into account the economic importance of the businesses involved and allows more meaningful comparisons to be made between countries, avoiding distortions due to differing industrial structures in each country. For the UK, results have also been weighted to reflect the employment distributions of businesses within each region.

The 2004 report builds on the structure of last year's report

Innovations this year

Addition of sector analyses

- This year, the report examines for the first time sectoral differences in the adoption and use of ICT, enabling a deeper investigation of the underlying themes.
- Respondents have been split into the following 8 sector categories, based on Standard Industrial Classification (SIC) codes:

Figure 1.0 Sector Categories

Sector	Description
Government	Public administration, education, health care
Financial services	Banking, insurance, pensions
Manufacturing	Food, drink, tobacco, textiles, clothing, motor vehicles, furniture
Transport and communication	Freight, post, telecoms
Services	Accountants, advertising, computing activities, estate agents, legal services, vehicle hiring
Primary industry	Agriculture, chemicals, mining, utilities
Retail/wholesale	Distribution, repairs, hotels, catering
Construction	Construction

Enhancement of the Sophistication Index

- A number of improvements have been made to the Sophistication Index in 2004.
- These changes fall into three categories:
  - Amendments to existing indicators (or creation of a new indicator) to capture new ICT, such as Voice over IP;
  - Amendments to indicators to increase focus on ICT sophistication, e.g. measuring whether government regulations have constrained businesses in the use of ICT rather than constrained businesses generally;
  - Changes to the scoring for various indicators, again to capture a more accurate view of the level of ICT sophistication, e.g. to account for the inter-dependencies of the benefits of deploying ICT(1).
- The resulting index provides a more granular and accurate understanding of ICT use in the 11 countries surveyed.
- As a consequence of these improvements, direct comparability with last year's results is not possible for some indicators, and occasionally, the scoring changes have led to a "harsher" assessment of an indicator, e.g. in which the same response as last year would have received a higher score.

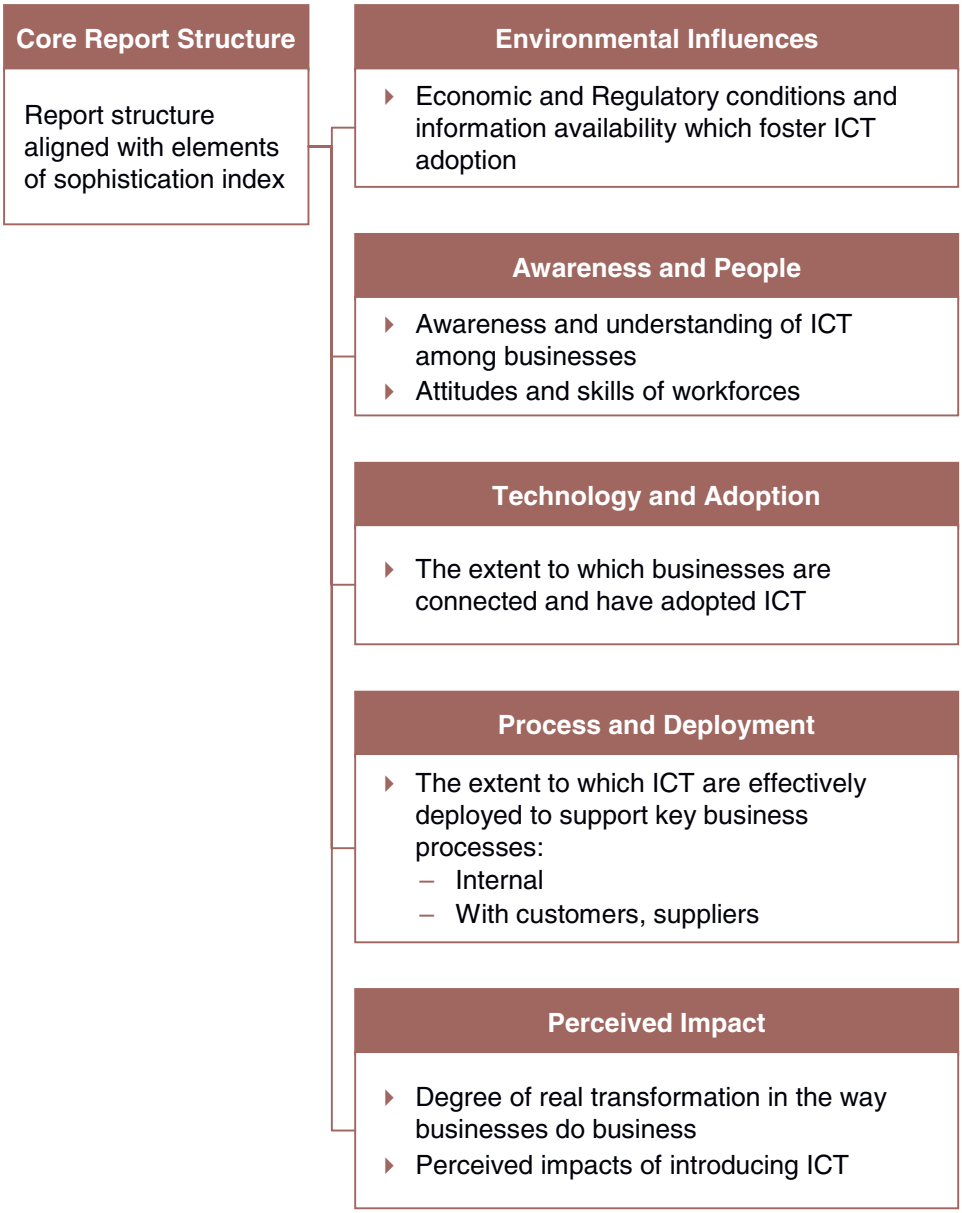
Addition of comparisons with other reports

- This year we have undertaken additional comparisons of our findings with those of other ICT reports and where appropriate, have inserted these insights throughout the report.

(1) Details of these changes may be found in the Technical Appendix which is available online at www.dti.gov.uk or www2.bah.com/dti2004

The report assesses the ICT progress of nations in five main categories

Figure 1.1 Report Structure



- The IBS 2004 report begins with a Summary of the survey's key findings. Chapter 3 focuses on the performance of the UK and assesses the UK's progress in 2004, noting areas of stronger and weaker performance.
- The core structure of the report is in line with the key elements of the Sophistication Index, although somewhat simplified. We group the main elements of the index into five chapters, as shown in figure 1.1, above.

The report assesses the ICT progress of nations in five main categories (cont'd)

- Chapter 4 discusses the Environmental Influences on businesses' ICT decisions, using survey questions on the sources of information businesses draw on to inform their ICT decisions.
- Chapter 5 discusses People and Awareness, drawing on survey questions on awareness, skills and attitudes.
- Chapter 6, on Technology with Adoption, captures the classic measures of Internet penetration and the adoption of basic ICT and more advanced ICT such as video conferencing or wireless LAN.
- Chapter 7 discusses Process and Deployment, the extent to which businesses are deploying ICT in their internal processes. Within this chapter there is a range of levels of sophistication of deployment ranging from simple publishing of information such as product availability, through to deeply transformational deployments such as integrating production scheduling systems with the requirement forecasting systems of a customer. This is the most detailed chapter, reflecting the importance of the business model in extracting real value from ICT adoption.
- Chapter 8 discusses Perceived Impact, the degree to which businesses have actually changed or perceive that they have changed as a result of their deployment of ICT.
- Beyond these core chapters are two chapters which focus on specific cross-sections of the analysis:
  - Chapter 9 discusses the Sophistication Index findings in detail and explains why the leading nations lead;
  - Chapter 10 concludes with a summary of regional variations around the UK for a selection of the key indicators.

2. Summary

2.1 Major trends

2.2 Other emerging themes in 2004

2.3 Chapter summaries
- Environmental influences
- People and awareness
- Technology and adoption
- Process and deployment
- Impact
- Sophistication index

Overall, businesses have become more discriminating in their use of ICT

Overview

- This year's results confirm several of the trends identified in last year's report:
  - Businesses continue to place greater emphasis on the *value* provided by ICT. This has been characterised by a significant increase in the proportion of businesses measuring the benefits of technology;
  - The shift in focus from access *per se* to the speed and reliability of connection continues. Levels of internet access appear to have reached a plateau whilst access speeds continue to rise.
- One of the dominant new themes this year is the growing selectivity of businesses in their deployment of ICT. This is consistent with the increased focus on value and the potential benefits of technology.
- The findings also highlight two trends in the UK that have changed:
  - Encouragingly, there are strong signs that the digital divide between larger and smaller businesses is closing, particularly in the UK;
  - Less encouragingly, the rapid increases in wireless and mobile technologies appear to have slowed.

Major trends

More businesses are measuring the benefits of technology

- There has been a significant increase in the proportion of businesses that are measuring the benefits of ICT. Increases were highest in the UK (up 15 percentage points), Ireland (up 13 percentage points), and the USA (up 10 percentage points). These increases are indicative of businesses becoming more sophisticated in the way they use ICT. The focus on costs adopted by many businesses following the dot.com crash is now being replaced by a more holistic approach to the assessment of ICT investments. Managers responsible for ICT are increasingly being asked to justify their budget requests and are becoming better at assessing potential benefits using metrics such as ROI, IRR, and NPV(1).

Businesses are becoming more selective in the type of information that they provide and the activities that they perform online

- In addition to measuring the benefits of technology, businesses have become more discriminating in the way they use it, focusing more on applications that deliver measurable benefits, such as order fulfilment and payment, and cutting back on the provision of non-core information:
  - The level of transactional activities such as online ordering, payment, and invoicing has increased in most countries;
  - In contrast, businesses are not as active as they have been in providing marketing material, information about after-sales support services and enabling the tracking of order progress.

(1) Return on Investment (ROI), Internal Rate of Return (IRR), and Net Present Value (NPV)

Businesses are also becoming more responsive to competitors

Businesses appear to have become more responsive to competitors and the wider business community

- The proportion of businesses that rate competitors as a major driver for ICT implementation has increased on average by 14 percentage points. There has also been an increase in the proportion of businesses that have taken direct action in response to competitors' use of online technology. However, businesses' ability to adapt to new technology remains largely unchanged.

There are significant differences in the level of ICT adoption across sectors

- The sector analysis has identified significant variations in the level of technology adoption and deployment across sectors. In general, financial services businesses have the highest levels of adoption and connectivity, whilst businesses in the primary and construction sectors typically have the lowest:
  - 96% of UK financial services businesses have a website, versus 80% of UK construction businesses and 74% of UK primary businesses;
  - In the 10 other nations surveyed, an average of 88% of financial services businesses have a website, versus 60% and 68% for construction and primary businesses respectively.
- Many of the variations between sectors in their ICT profile can be attributed to the inherent differences in general business processes. For example, manufacturing businesses are more likely to benefit from systems that are integrated with suppliers than most services businesses.
- Levels of e-commerce also vary significantly by sector:
  - The average proportion of total purchases online (by businesses that order online) is highest among retail businesses (36% in the UK and 38% on average in the 10 other nations) and lowest amongst construction businesses (17% for UK businesses and 21% for the 10 other nations);
  - Similarly, the average proportion of sales made online (by businesses which enable customers to order online) varies in the UK between 28% (transport and communication) and10% (primary) of businesses;
  - In other nations, the proportion varies from 30% in financial services businesses to 13% in government.
- Sector variations in the levels of e-commerce reflect differences in product characteristics and the composition of the supply chain. Orders placed by retail businesses are typically well-suited to online procurement: high volume, many standard products and a high percentage of repeat orders from a core supplier base.

In contrast to last year, only two countries have shown a significant improvement in the level of ICT sophistication

Movement among Nations

Overall levels of ICT sophistication have remained largely unchanged in many countries

- Sweden, Ireland, and the UK are the leaders in this year's overall Sophistication Index; Ireland is the only one of these countries to have been in the top three places last year, when it ranked first.
- This year, Sweden tops the overall Sophistication Index and is the leading country in five of the eight sub-indices: Environment, Adoption, Technology, Process, and Deployment:
  - Sweden has shown the greatest improvement in Environmental indicators in comparison to the other countries surveyed;
  - Swedish businesses are now the most likely to gain/share technology information with customers and suppliers and to interact online with government.
- The USA and Canada have slipped in the overall Sophistication Index, due partly to declines in their own levels of sophistication, and due also to the rise in sophistication of other nations, such as Sweden and the UK.
- Japan, France and Italy record the lowest sophistication scores – consistent with last year.

Businesses in the UK have shown clear improvements across a range of ICT indicators

- Broadband penetration is accelerating; the proportion of businesses using xDSL has almost doubled (13% to 24%) and, of businesses with a high-speed connection, over 60% have connections with a bandwidth of 1 Mbps or more. UK businesses now lead in the adoption of wireless LANs and are among the leaders in the uptake of Voice-over-IP and desktop video conferencing.

Japanese businesses have become considerably less satisfied with the ICT skills of their staff

- Only 37% of businesses with technology in Japan report being either completely or mostly satisfied, a 15 percentage point decrease since 2003, and 30 percentage points below the average for the other countries surveyed. The low levels of satisfaction are consistent with the relatively high proportion (24%) of businesses in Japan that regard lack of skills to be a barrier to the implementation of ICT and the sharp decrease in the number of staff that react enthusiastically to change. One reason for this may be the increased reliance on internal staff for ICT implementation (32% of Japanese businesses with technology use internal staff only to implement ICT projects, up 12 percentage points from 2003, and 5% use external contractors only compared with 13% in 2003).

Government influences on ICT adoption remain low; in general, attitudes towards technology are still positive

Environmental Influences

Businesses gather ICT insights from a broad range of sources

- Consultants remain the principal external influencers in the majority of countries. Business relationships, such as those with customers, suppliers and competitors, are also highly influential.
- Government's share of mind remains low relative to this. However, several countries, including the UK, have shown improvements in the usage of government business support organisations.
- The level of sophistication of online interactions between businesses and government remains largely unchanged in most countries, with the exception of Sweden, where the level of interaction has increased.
- Regulations and national standards are not generally viewed as a hindrance.

People and Awareness

Businesses and staff are generally positive towards ICT. Costs remain the major barrier to adoption

- Business and staff attitudes remain generally very positive towards ICT:
  - 84% of businesses survey-wide, and 89% of businesses in the UK express the view that online technologies are beneficial.
- There are some strong similarities between businesses in English-speaking countries in their attitudes towards change and adopting new technologies:
  - Businesses in English-speaking countries seem to perceive change as an obstacle, particularly when compared with other European countries such as Germany and Sweden;
  - They are the most likely to cite costs, both fixed and variable, as a barrier to ICT implementation;
  - They also show a marked preference for the use of informal approaches to keep informed of new or changing business processes. In contrast, businesses in Germany and Sweden typically rely more on formal approaches.
- In most of the countries surveyed, the majority of businesses have a written business plan. However, considerably fewer have a documented IT strategy.
- In general, businesses perceive that they have a more positive attitude to change than that of their staff. This difference is most notable among Japanese businesses and implies a stark difference between directors and employees.
- Outsourcing of ICT training is increasing in many countries:
  - More businesses are recognising that they have deficiencies in their in house IT skills;
  - There is greater awareness of and preparedness to outsource ICT training;
  - Consequently barriers to implementation are increasingly seen as cost-based rather than skills related.

Broadband penetration is rising rapidly

Technology and Adoption

Internet access levels among businesses remain stable although access speeds are continuing to rise

- The proportion of businesses with internet access and a website is reaching a plateau in most countries.
- Survey-wide there has been a steady increase in the adoption of broadband technologies as businesses demand faster connections and higher quality of service:
  - Growth in xDSL has been particularly strong, displacing older dial-up and ISDN technologies;
  - Across all nations, more than 50% of businesses have upgraded their connection speed in the last 2 years.
- In contrast, adoption of mobile technologies has been slower and has even declined in some countries:
  - In the USA and Canada, the proportion of businesses using wireless LANs and remote or mobile terminals appears to have dropped significantly;
  - These declines are surprising, although may in part be attributed to increased security concerns. In addition, some early adopters have been unable to realise the operational benefits that they had initially hoped for (such as increased workforce flexibility) and have divested.
- The UK is among the leading nations in the adoption of several emerging technologies such as wireless LANs and VoIP.

Process and Deployment

Growth in the proportion of businesses using e-commerce appears to have slowed, although amongst those that use it, online trading has increased

- The average percentage of total sales made by businesses using online technologies increased in the majority of countries.
- However, the strong growth in the proportion of businesses using online channels, identified in last year's survey, has slowed considerably, and in five of the eleven countries surveyed (Germany, USA, Canada, Ireland and Japan) there has been a slight decline in the number of businesses reporting use of e-commerce.
- Businesses have made significant improvements in integrating their internal systems, helped in part by the increasing interoperability of systems.
- Integration with external parties has progressed more slowly. There is a slight decrease in the number of businesses that intend to integrate with their suppliers but no significant change in the levels of integration with customers.
- Supply-side applications remain the favoured area of ICT deployment.

Growth in e-commerce has slowed but ICT continues to create value

Impact **Businesses are realising a wide variety of benefits, ranging from increased efficiency to improved communications**

- Improved efficiency, speed of access and customer communication are the most commonly cited benefits realised from the adoption of online technologies.
- For businesses that allow ordering online, online sales as a percentage of total sales grew in seven out of the eleven countries surveyed:
  - In the UK,19% of the total sales of businesses which sell online are made through the online channel, up 5 percentage points from 2003.
- The proportion of businesses realising *additional* benefits (over and above those originally planned for) from ICT implementations has fallen in the majority of countries, in part because businesses have become more adept at predicting benefits.

Sophistication Index **Sweden leads in the overall Sophistication Index, closely followed by Ireland and the UK**

- In terms of absolute positions, the eleven countries surveyed fall into three distinct groups:
  - Sweden, Ireland and the UK form the leading group;
  - Germany, South Korea, Canada, the USA and Australia form an intermediary group; and
  - Italy, Japan and France form a trailing group.
- The sophistication scores of several countries have declined since 2003:
  - With the exception of the USA, Canada and Japan, these declines are not statistically significant.
- The declines in the sophistication scores for the USA, Canada and Japan are partly a result of a decline in the adoption of some ICT and also reflect the slightly harsher scoring used for some questions:
  - In the USA, the proportion of businesses using e-marketplaces has dropped by 11 percentage points;
  - In Canada, the adoption of remote/mobile terminals, wireless LANs, and remote synchronised terminals have all fallen;
  - Similarly, in Japan, significantly fewer businesses are using wireless LANs (down from 16% in 2003 to 11% this year) and remote/mobile terminals (down from 50% in 2003 to 29% in 2004).

3. ICT in the UK 2004

UK businesses have improved in their understanding, adoption and use of ICT over last year

The good news

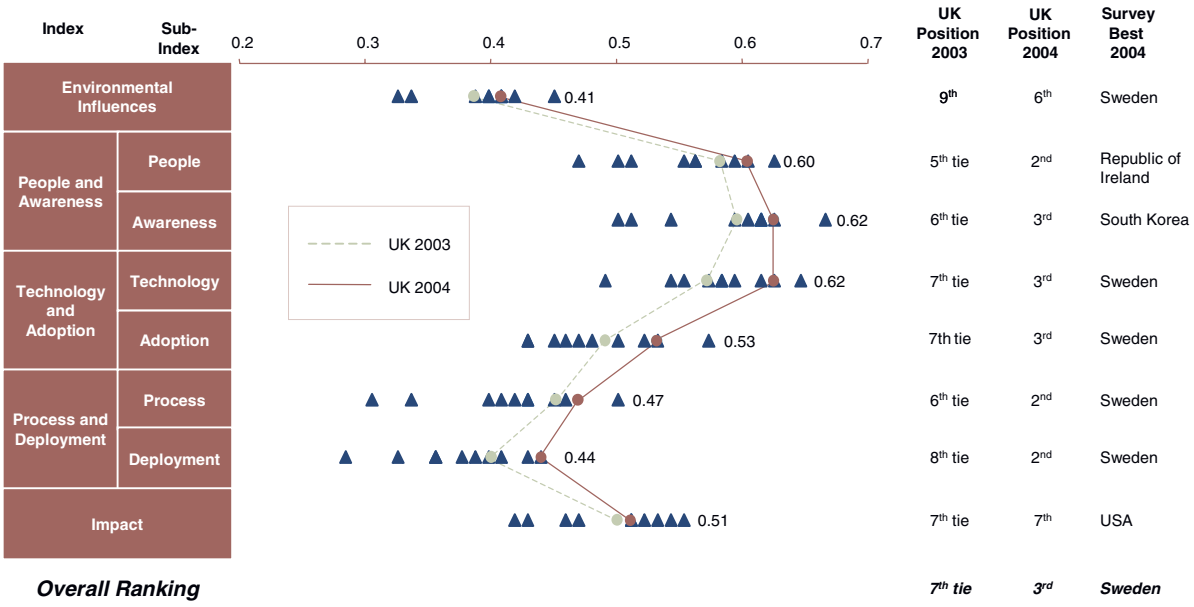
- There are strong trends across all indicators of increasing ICT sophistication. UK businesses are:
  - More connected to the internet through broadband. xDSL usage in particular almost doubled from last year (13% to 24%);
  - Using external e-mail more widely. On average, 44% of employees use e-mail on a daily basis, up from 35% in 2003;
  - Amongst the leaders of adoption of new ICT such as Voice over IP and desktop video conferencing;
  - Paying for goods and services online more often. In 2004, 31% of business paid for goods online, up 6 percentage points from 2003.
- Micro and small businesses appear to be closing the digital divide of the last few years:
  - The proportion of small and micro businesses with a website has increased by 16 percentage points;
  - Similarly, in trading online(1), micro businesses have almost doubled from 17% to 30% and small businesses have moved from 22% to 31%.

The challenges remaining

- Despite significant improvements, businesses continue to require improvements in some areas:
  - The proportion of businesses that allow customers to order online (37%) is significantly below the level in leading nations;
  - UK businesses trading online still trail leading countries in terms of the average proportion of sales made online, as well as the average proportion of goods and services ordered online.

The UK has improved in all five of the indices in the Sophistication Index

Fig 3.1 The UK's ICT sophistication



(1) To be counted as "trading online" a business must fulfil the following function: Online trading = f[(enabling customers to order online AND (enabling customers to pay online OR pay for own goods/services online) OR (order own goods/services online AND (enabling customers to pay online OR pay for own goods/services online)]

Both external and internal drivers are exerting greater influence on UK businesses in the adoption of ICT

Environmental Influences

- The degree of influence of external drivers in the adoption of ICT appears to have increased:
  - Customers are still the strongest external driver, followed by competitors;
  - Suppliers remain the least influential external driver for UK businesses.
- As in previous years, external, non-governmental bodies are cited more frequently than their government counterparts as sources of advice.
- Industry bodies and trade associations are also cited as providing tangible benefit to UK businesses slightly more often than local authorities and government business support organisations (47% versus 43% and 44% respectively).
- More businesses are making online tax (or other) payments to government, though slightly fewer businesses are interacting with government via e-mail. This decline may be due to an increase in website functionality, which precludes the need for e-mail interaction.

People and Awareness

- The proportion of businesses using technology that measure the benefits(1) of ICT has risen significantly, from 38% to 53%.
- The UK business community continues to have a good attitude towards technology adoption. 71% of businesses respond positively towards its use in business.
- UK businesses are among the most likely to have both written business plans and documented ICT strategies.
- Businesses perceive internal drivers as exerting greater influence in 2004, with increases in ratings for directors, IT employees and internal users.
- 77% of UK businesses with a technology report that employee ICT skills are either completely or mostly sufficient – no change on last year.
- More UK businesses who do not believe current ICT skills meet the needs of their business are training their staff, in particular on an “as required” basis (from 28% to 43%), suggesting a more selective approach to building ICT skills, rather than a blanket approach.

(1) Those measuring benefits either “frequently” or “some of the time”.

In Process and Deployment, businesses are moving forward confidently, especially in the service sector

Technology and Adoption

- UK businesses with technology continue to adopt ICT for a wide variety of reasons. The most commonly cited reasons are to:
  - *Increase the efficiency of their processes*, cited by 22% of businesses with a technology;
  - *Improve communication with customers*, cited by 18% of businesses with a technology;
  - *Keep up with progress*, listed by 15% of businesses with a technology.
- Broadband adoption is accelerating. The proportion of businesses using xDSL has almost doubled (13% to 24%) and over 60% of UK businesses have internet connections with a bandwidth of over 1 Mbps.
- UK businesses lead in wireless adoption:
  - Wireless LAN use has increased to 28% of businesses - the highest proportion across the study;
  - In addition, remote synchronised terminal use has risen from 39% to 42%, a figure only bettered by Sweden in the survey.
- UK businesses are early adopters of new technologies, such as Voice over IP and Desktop Video Conferencing. They lead in the number and range of technologies applied to their business activities – competing with Sweden and Ireland for the lead position.
- This year, more businesses that have not yet adopted key technologies such as internet access, e-mail and websites are planning to do so immediately or are actively considering it, suggesting that adoption may rise again next year.

Process and Deployment

- Businesses believe ICT improves processes. 70% of UK businesses with a network already have or intend to integrate their internal systems to improve information sharing across their organisation.
- ICT is being used in more “transactional” activities such as banking (up 18 percentage points), invoicing (up 14 percentage points) and stock taking (up 10 percentage points).
- Businesses are using technology more to foster greater interaction with others :
  - More functionality and information is available online to customers;
  - More businesses are searching for and buying from suppliers online.

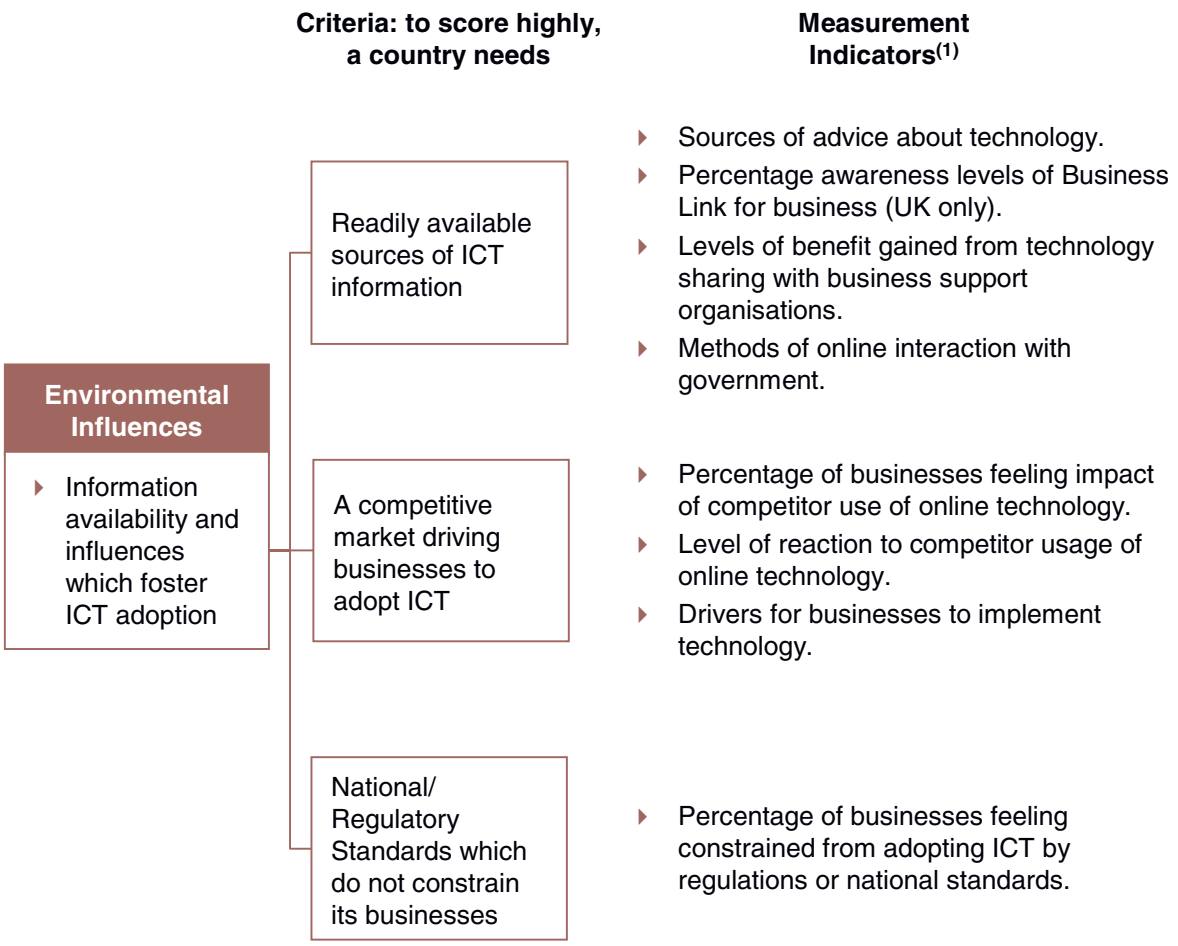
Impact

- The proportional value of online sales and purchases has increased significantly:
  - The average proportion of goods and services ordered online, as a percentage of total goods and services ordered by businesses placing orders online, is up 8 percentage points, from 16% to 24%;
  - Similarly, the average proportion of the total value of sales made online by businesses enabling customers to place online orders has risen 5 percentage points, from 14% to 19%.
- Despite these rises, UK businesses are not reporting as many benefits from the use of ICT as a number of the other countries surveyed.

4. Environmental Influences

4. Definition

Environmental Influences refers to the set of external factors which influence business decisions on whether and when to adopt ICT

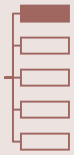


Definition

- "Environmental Influences" for ICT refers to the set of external factors which influence businesses' decisions on whether and when to adopt ICT.
- Countries whose "Environmental Influences" are supportive of ICT uptake exhibit the following characteristics:
  - Readily available sources of, and advice on, ICT information:
    - Information available from a wide variety of sources;
    - Provision of information from Government sources which is rated highly by users.
  - A competitive market driving businesses to adopt ICT:
    - Businesses which have felt the influence of other businesses implementing ICT;
    - Businesses which have reacted by implementing solutions, matching competitors or putting in place an innovative alternative solution.
  - National/Regulatory Standards that do not constrain its businesses:
    - Businesses which do not rate themselves as being heavily constrained by national standards or excessive regulation.

(1) All indicators relating to Environment are listed. Those not directly addressed within this chapter are italicised.

Businesses survey-wide have become more responsive to their environment and more reliant on external information providers



Overall findings and key themes

Businesses survey-wide have become more responsive to their environment

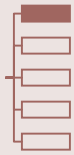
- Businesses continue to gather information from a wide variety of sources, external information providers being cited most frequently:
  - Consultants, the media, journals and books remain the most common external sources of information.
- Overall, businesses appear to have become more responsive to competitors and the wider business community, with the most responsive being in France, Germany, USA and the UK.
- The level of sophistication of online interactions between businesses and government remains largely unchanged in most countries with the exception of Sweden, where the level of interaction has increased.
- There is significant variation between countries survey-wide in the number and type of interactions between businesses and government.
- Regulatory barriers to the adoption of ICT have decreased in most countries, especially in France.

Leading nations

Overall Sweden and South Korea appear to have the best environments for ICT development

- Sweden continues to lead in many of the key environmental indicators:
  - Swedish businesses are the most likely to share technology knowledge with customers and suppliers, and to interact online with government;
  - The number of Swedish businesses that perceive regulations as a constraint has almost halved.
- South Korea has also scored consistently highly across a wide range of metrics and has shown significant improvement in several key areas:
  - Businesses have become more responsive to the ICT investments of competitors;
  - Regulation is perceived as less of a hindrance.
- Government business support organisations (GBSOs) in English-speaking countries appear to provide tangible benefits to a higher proportion of businesses than those in other countries.

The environment within the UK has become more supportive of ICT uptake



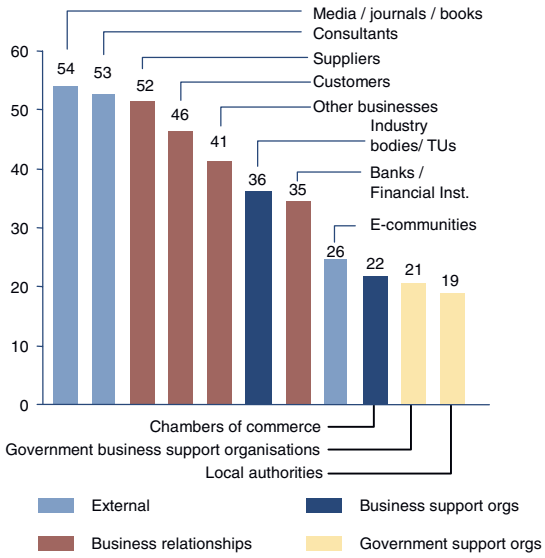
UK position

UK businesses appear to be increasingly influenced by both government and competitors with respect to ICT

- Usage of UK GBSOs has increased by 4 percentage points:
  - Growth in usage may in part be driven by an increase in the proportion of government organisations using GBSOs – around three times more government organisations use GBSOs compared with those in other sectors.
  - The increase in usage is highest amongst micro businesses (up 6 percentage points);
  - Within the private sector, usage is highest amongst primary industries, construction businesses and transport and communications;
  - Usage is lowest amongst wholesale/retail businesses;
  - Of those using Business Link in the UK, 51% of businesses find that it provides them with tangible benefits.
- There are signs that the UK market has become more competitive. Of businesses citing competitors as a strong driver in implementing technology change, 61% (up 8 percentage points from 2003) have implemented an ICT solution in response to ICT deployment by competitors.
- The proportion of businesses that share or gain technology knowledge or advice with customers and suppliers has increased.
- The proportion of businesses in the UK conducting transactions online with the government has also increased although it is still below that of leading nations:
  - 5% of businesses in the UK reported that they make tax and other payments online compared with 18% in Sweden and 9% in Ireland.
- The UK is amongst the leading countries in terms of the proportion of business that find a tangible benefit in their interactions with local authorities.
- Around nine out of ten businesses do not perceive national/regulatory standards to be a hindrance to the adoption of ICT (no change from last year).

Businesses survey-wide gather ICT insights from a wide range of sources

Fig 4.2a Businesses' sources of technology advice (%)

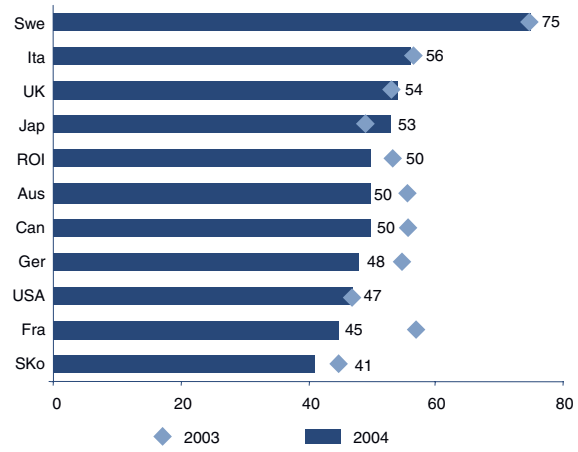


Question: "Do you gain or share technology knowledge/advice with any of the following sources?"
Base: Arithmetic average of business responses in 11 survey countries

Consultants, the media, journals and books are still the most common external sources of information; government share of mind remains low

- There has been little change over the last year in the proportion of businesses using each of the main information sources.
- Business relationships, particularly those with suppliers, remain an important source of information.
- A deeper analysis reveals that use of different information sources varies by sector and size of business:
  - Services businesses and government organisations are the most likely to use external sources;
  - Retail businesses typically access fewer information sources;
  - Larger businesses utilise external sources, especially consultants, more than smaller businesses.

Fig 4.2b Businesses sharing technology advice with suppliers (%)



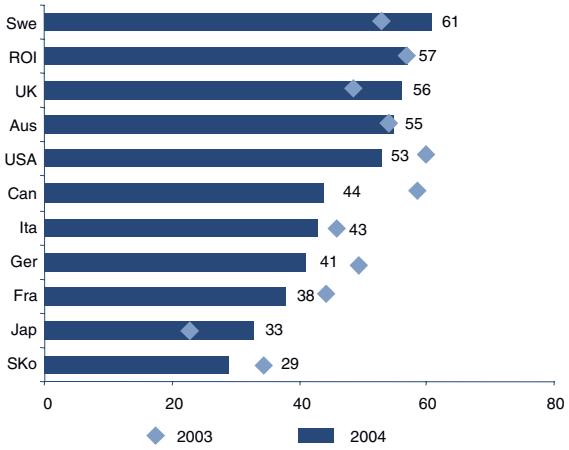
Question: "Do you gain or share technology knowledge/advice with any of the following sources?" and response "Suppliers"
Base: All businesses

Swedish businesses remain the most likely to gain or share information about ICT with suppliers

- In most countries, around half of businesses interact with suppliers to share or gain technology advice:
  - Swedish businesses are an exception – significantly more (around three quarters of all Swedish businesses) share information with suppliers.
- Japan has shown the greatest increase, with around 6 percentage points more businesses now sharing information with suppliers than in 2003.
- France shows the greatest decrease (down 10 percentage points).
- Businesses in South Korea remain the least likely to share information with suppliers.
- Government organisations, financial services, and transport and communications businesses are the most likely to share information with suppliers, while primary industry and construction businesses are among the least likely to share information.

Businesses survey-wide gather ICT insights from a wide range of sources (cont'd)

Fig 4.2c Businesses sharing or gaining technology advice with customers (%)



Question: "Do you gain or share technology knowledge/advice with any of the following sources?" and response "Customers"
Base: All businesses

The number of businesses sharing technology knowledge or advice with customers has declined in six of the eleven countries surveyed

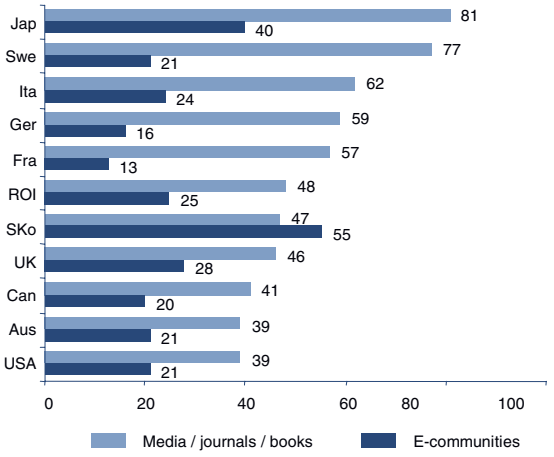
- There has been a significant drop in the number of businesses in the USA and Canada that are sharing/gaining information about ICT with their customers.
- In contrast, the proportion of businesses in the UK and Sweden that are now sharing information about ICT with customers has risen by 8 percentage points.
- There was also a significant increase in the number of Japanese businesses conferring with customers about ICT, but despite the 11 percentage points rise, they remain among the least likely to share information.
- Transport and communications businesses are the most likely to gain or share information from customers, followed by manufacturing businesses.

Discussion of Drivers

- The high proportion of Swedish businesses who share technology knowledge and advice with suppliers is in part due to the country's industry structure: a few large organisations work with a large number of national suppliers, who are often forced to comply with the buying practices of their larger customers.
- South Korea has a relatively high proportion of very small establishments which makes it harder for businesses to share knowledge and best practice.
- The drop in the number of businesses sharing ICT information with customers in the USA and Canada is possibly a result of increased security concerns.
- The rationale for sharing information with customers and suppliers differs. Businesses often share technology knowledge and advice with suppliers to reduce material costs and to improve the quality of supplies. In contrast, businesses typically share technology with customers to increase sales and to develop new products or applications.

Industry sources are more commonly used than government for advice

Fig 4.2d Businesses gaining or sharing technology advice from media/journals/books and e-communities (%)

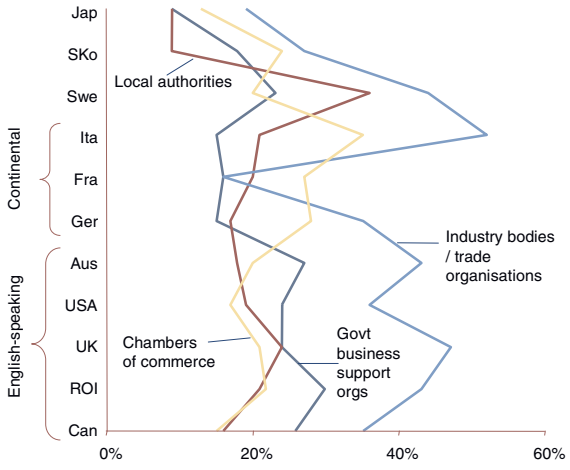


Question: "Do you gain or share technology knowledge/advice with any of the following sources?" and responses "Media, journals, books" and "E-communities"
Base: All businesses

Higher proportions of businesses in non-English-speaking countries gain advice from media and books

- Businesses in English-speaking countries tend to gain information through direct interactions rather than published information.
- Overall usage of e-communities as a source of advice has stayed at similar levels compared to 2003:
  - Businesses in South Korea remain the biggest users (55% of all businesses).
- In the UK, usage of media/journals/books is significantly higher amongst government organisations than private sector businesses.

Fig 4.2e Businesses gaining technology advice from a business support organisation (%)



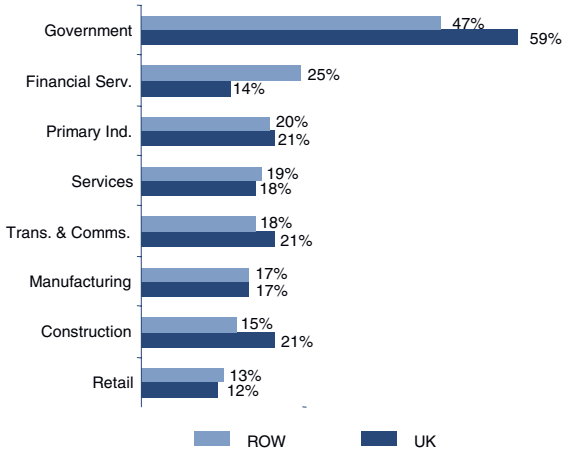
Question: "Do you gain or share technology/advice with any of the following sources?" and responses for organisation types shown
Base: All businesses

Industry bodies/trade organisations are more commonly used for advice than government organisations or Local Authorities

- English-speaking countries have a similar profile of use, with industry bodies/trade organisations being used the most for advice, followed by government business support organisations:
  - Use of industry and trade bodies has fallen significantly in Canada (down 19 percentage points) and the USA (down 13 percentage points).
- Businesses in continental European countries are more likely to consult with Chambers of Commerce than government business support organisations.
- Japan consistently shows the lowest levels of interaction with government business support organisations and local authorities.

Survey-wide, government organisations are the most prolific users of GBSOs

Fig 4.2f Government business support organisations - usage by sector

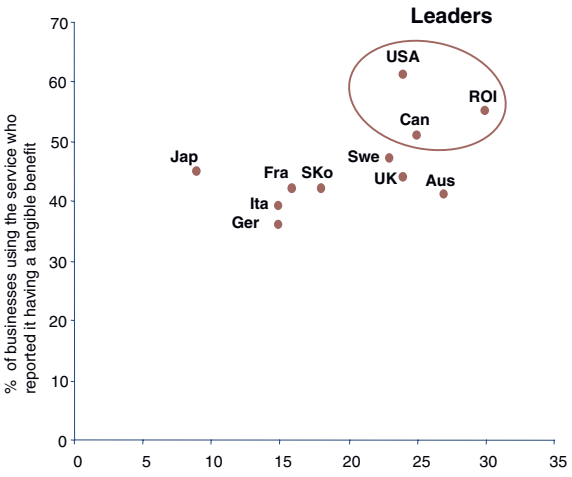


Question: "Do you gain or share technology/advice with any of the following sources?" and responses for organisation types shown
Base: All businesses

There is significant variation by sector in the proportion of businesses that gain or share technology knowledge or advice from GBSOs

- Government organisations are the mostly likely to share technology advice with GBSOs.
- Retail businesses are typically the least likely to share technology advice with GBSOs.
- With the exception of financial services businesses, construction businesses and government organisations, the level of usage of GBSOs by each sector in the UK is similar to the sector averages for the other countries surveyed.

Fig 4.2g Government business support organisations and the tangible benefit they bring to businesses



Question: "Does your business gain or share technology knowledge/advice with government business support organisations?"; "Have these organisations provided a tangible benefit to your business?"
Base: All businesses that use external sources for advice about ICT
Note: Question regarding benefits was modified in 2004 to make it more specific to ICT: the words "in terms of your understanding and use of ICT" were added.

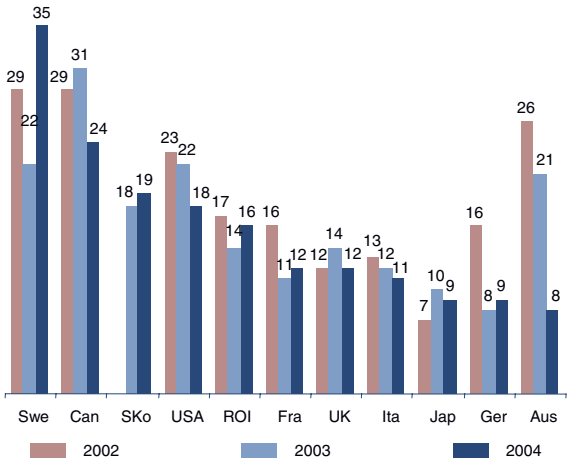
Use of GBSOs is driven somewhat by whether businesses perceive them as beneficial

- There is a clear correlation between the percentage of businesses in a country that gain advice from GBSOs and the percentage that believe they provide tangible benefits.
- The USA, Ireland and Canada still appear to have the most effective programmes in that they are widely used and have the highest perceived effectiveness.
- The difference in usage of GBSOs in these three leading countries and usage in the next five countries is less pronounced than in 2003.
- The UK has shown some improvement in the level of usage, although the perceived effectiveness of GBSOs has declined by 8 percentage points.
- Italy and Germany form a trailing group in both usage of GBSOs by businesses, and perceived benefits derived from that use.

Levels of online interaction with government remain stable in most countries

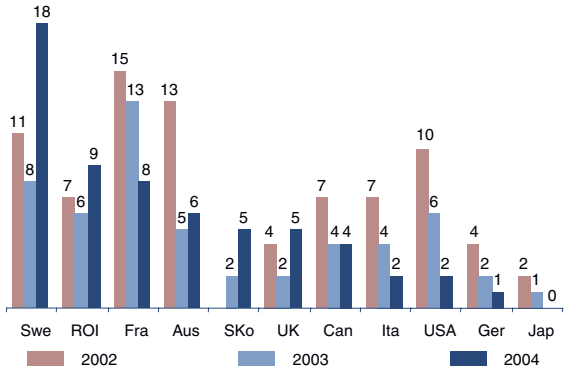
Fig 4.2h Businesses' methods of online interaction with government (%)

e-mail interaction



Question: "Do you have any online interaction with regional, local or central government via e-mail?"
Base: All businesses

Fig 4.2i Tax or other payments



Question: "Do you have any online interaction with regional, local or central government by making tax or other payments?"
Base: All businesses

E-mail communication with government has fallen in several countries

- Levels of e-mail communication between businesses and government have fallen for the second year in many countries:
  - The most significant fall was in Australia, where less than half as many businesses reported interacting by e-mail with government than in 2003.
- Growth was highest in Sweden and over a third of Swedish businesses now interact with government by e-mail.
- The UK has seen a slight decline, with 12% of businesses reporting to communicate by e-mail, compared with 14% in 2003.
- Larger businesses are much more likely to interact with government by e-mail than small and medium sized businesses.

However, the survey-wide decline in tax and other payments made online seen last year seems to have ended in many countries.

- There has been an increase in the proportion of businesses making tax or other payments online in Sweden, Ireland, the UK, Australia and South Korea.
- Sweden registers the greatest increase –18% of businesses now make payments to government online compared with only 8% in 2003.
  - One reason for this increase may be the high levels of co-ordination between government and businesses(1).
- Though there have been decreases in the proportion of business making such payments in several countries, only the decline in France can be considered significant.

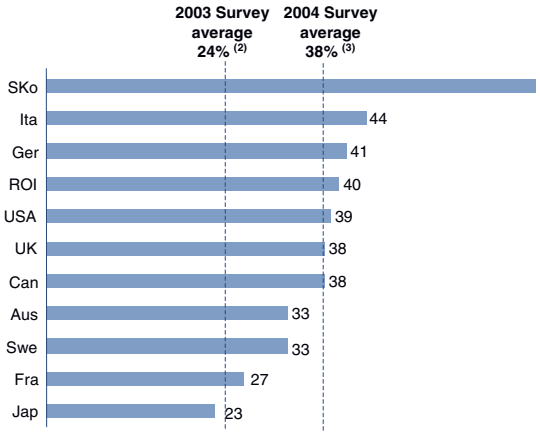
Discussion of Drivers

- The sustained decline in the level of e-mail interactions between businesses and government seen in many countries is not necessarily indicative of a decline in the sophistication of ICT adoption and could be the result of improved service provision:
  - Online forms are becoming more frequently used within government websites (for example by Companies House in the UK) and are replacing e-mail interactions;
  - Government is making information more accessible, either online or through other channels thereby reducing the number of e-mail enquiries.
- The increase in the level of tax and other payments online may be as a result of government incentives. For example, some countries, such as Ireland, offer an extended filing period for users of online tax filing services.(2)

(1) Source: The Economist Intelligence Unit's 2004 e-readiness rankings
(2) Source: Accenture, E-Government Leadership 2004

Businesses are becoming more responsive to the actions of competitors

Fig 4.3a Businesses rating competitors as a major driver(1) for ICT implementation (%)

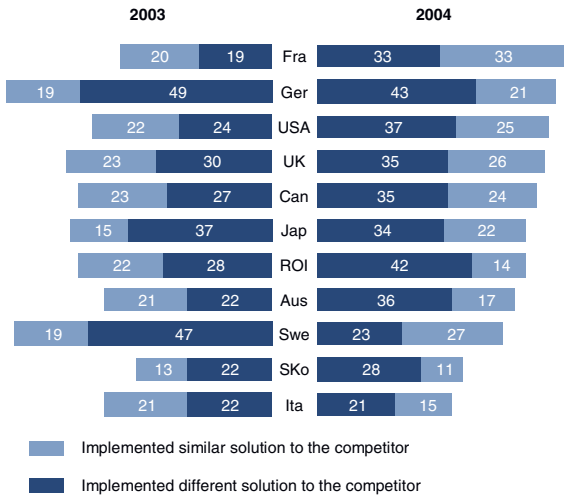


Question: "To what extent does the drive to implement any technology change come from competitors: please rate on a score between 0-10 where 10 is 'large driver' and 0 is 'not a driver?'".
Base: All businesses

The actions of competitors have greater influence on businesses' ICT decisions

- Businesses within South Korea are most likely to perceive the actions of competitors as a driver for ICT investment.
- Behind Korea is a group of 6 countries in which around 40% of businesses rate competitors as a major driver for ICT implementation.
- The relative differences between countries are similar to 2003, with the exception of businesses in Japan which have become considerably less responsive to the actions of competitors.

Fig 4.3b Business responsiveness to competitive pressure (%)



Question: "Have you considered any action in relation to the impact of a competitor's use of online technology?"
Base: All businesses that stated that competitors were a large driver (6 to 10) to implementing technology change.

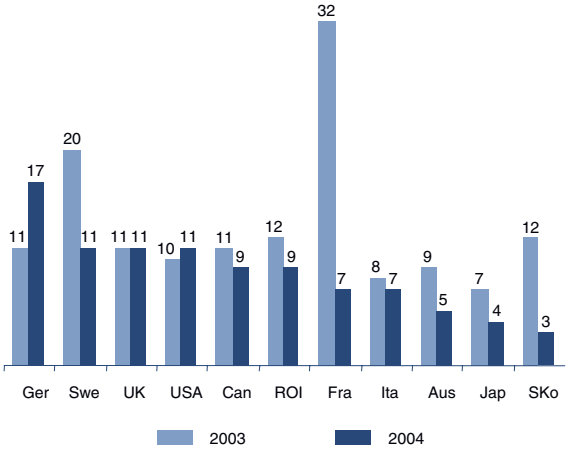
Of the businesses that perceive competitors as a strong influence, those in France and Germany are the most likely to take direct action

- Businesses in France have become significantly more responsive to the ICT investments of competitors:
  - Two thirds of French businesses which reported feeling the impact of a competitor's use of ICT implemented a new solution, up 27 percentage points from 2003.
- Despite having the highest percentage of businesses which feel the effects of competition, only a low proportion of South Korean businesses have actually taken action. This may well change soon, as a large proportion (29%) are planning to implement a new solution and many may be able to take advantage of new tax incentives aimed at promoting ICT.

(1) Competitors are considered a "major driver" if assigned a rating by respondents of between 6 to 10 (inclusive, on a scale of 0 to 10) as a measure of the degree of influence of competitors on ICT adoption.
2) Arithmetic average based on responses in 11 survey countries of businesses that responded "yes" to the question: "Is the online usage of any competitor having an impact on your business?"
(3) Arithmetic average based on responses in 11 survey countries of businesses that rated competitors at 6 to 10 on a 0-10 scale.

Regulations are not generally viewed as a hindrance. Many businesses report government as an active driver of ICT implementation

Fig 4.4a Businesses feeling constrained by regulation in adopting ICT – 2003 to 2004 %



Question: "Has your business been constrained from adopting or deploying ICT in any way because of regulations or national standards, whether or not directly related to technology?"
Base: All businesses

Overall there has been a decrease in the proportion of businesses survey-wide that perceive regulations or national standards as a hindrance to ICT development.

- In South Korea the proportion of businesses that perceive that regulations hinders ICT development has declined by 9 percentage points;
  - The decline may be the result of a government effort to reduce legislative constraint, particularly among micro-sized businesses which make up a large proportion of the country's business community.
- There has also been a dramatic decline in France;
  - However, since there have been no significant regulatory changes in the last year it is possible that the fall may in part be attributed to a change in the wording of the question since last year [(1)].
- Germany is the only country where a higher proportion of businesses reported that regulations have become a large constraint.
- Just over one in ten businesses in the UK perceive regulations as a hindrance to ICT development, the same proportion as in Sweden and the USA.

(1) In the 2003 survey the question asked about constraints in general, "whether or not directly related to technology".

5. Awareness and People

Awareness and People measures the receptiveness of businesses and staff to ICT

	Criteria: to score highly, a country needs	Measurement Indicators[1]
Awareness and People ▸ Awareness and understanding of ICT among businesses ▸ Attitudes and skills of workforce	Businesses with positive / receptive attitudes towards ICT	▸ Attitudes of business to online technologies. ▸ Extent to which the drive for technology change comes from internal sources. ▸ Reaction of staff to new technologies. ▸ Business receptiveness to change. ▸ Difficulties in implementing technology changes.
	Management who monitor and plan for the use of ICT within their businesses	▸ Methods of keeping informed of changing business processes. ▸ Methods of keeping informed of ICT that could impact businesses. ▸ % of businesses with a written business plan. ▸ % of businesses with a documented IT strategy.
	A skilled and technologically aware workforce	▸ Current ICT skills meeting the needs of businesses. ▸ % of employees making daily use of e-mail. ▸ *How well businesses optimise ICT usage.* ▸ How businesses address ICT shortfalls.

Definition

- "Awareness and People" refers to the receptiveness of businesses and staff to ICT. It comprises:
- Businesses with positive/receptive attitudes towards ICT:
  - Staff who enthusiastically embrace ICT;
  - Businesses that see online technologies offering real benefits;
  - Businesses that are adaptable; where change rarely presents a challenge, or where challenges are routinely overcome.
- Management that monitors and plans for the use of ICT within businesses:
  - Processes for keeping up-to-date with new procedures/practices and ICT that could benefit/ impact businesses;
  - Written business plans and IT strategies;
- Workforces which are skilled and technologically aware:
  - ICT skills within businesses which meet the organisation's needs;
  - Processes to address IT skills shortfalls by structured ICT training;
  - Business skills which optimise usage of ICT.

(1) All indicators relating to Awareness and People are listed. Those not directly addressed within this chapter are italicised.

Attitudes towards ICT remain positive survey-wide. Costs remain the major barrier to adoption

Overall findings and key themes

Businesses remain receptive towards ICT and are focusing more on measuring benefits than costs. Costs remain a significant barrier to adoption

- Business attitudes to ICT and staff reactions to new technology remain positive.
- Businesses in English-speaking countries still seem to perceive change as an obstacle**,** particularly when compared with other European countries such as Germany and Sweden.
- In most of the countries surveyed, the majority of businesses have a written business plan. However, considerably fewer have a documented IT strategy.
- Businesses in English-speaking countries show a marked preference for the use of informal approaches to keep informed of new or changing business processes – in contrast, businesses in Germany and Sweden typically rely more on formal approaches.
- Outsourcing of ICT training is increasing in many countries, as we would expect to see as the market matures further:
  - More businesses are recognising that they have deficiencies in their in-house IT skills;
  - There is greater awareness of and preparedness to outsource ICT training;
  - Consequently barriers to implementation are increasingly seen as cost rather than skills related.

Leading nations

The UK and Ireland emerge as leaders in "Awareness and People"

- Overall**,** businesses in the UK and Ireland have the highest awareness of ICT and show the most confidence in the ICT skills of their staff:
  - Businesses show highly positive attitudes towards ICT;
  - Staff show the most positive reactions towards new technologies.
- Businesses from the UK and Sweden are the most likely to have a documented ICT strategy.

Attitudes towards ICT remain positive survey-wide. Costs remain the major barrier to adoption (cont'd)

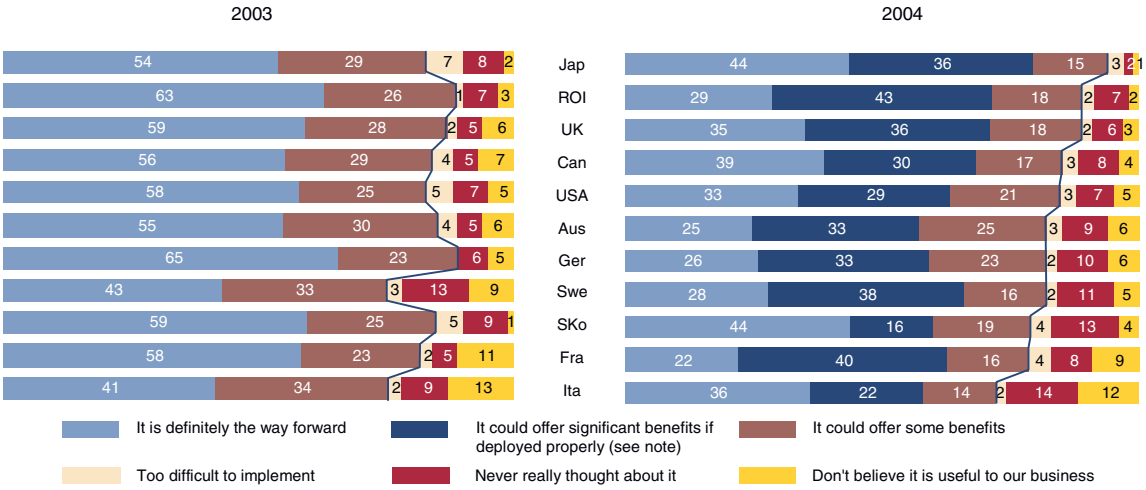
UK position **UK businesses remain positive about ICT and are good at planning**

- Attitudes to ICT remain positive among UK businesses, although many remain change averse:
  - 89% of businesses have a positive attitude towards online technologies;
  - 72% of businesses with technology and staff report staff as having a positive attitude to the introduction of new technologies;
  - However, only 23% of businesses report adapting to change with ease, among the lowest proportion of the surveyed countries.
- Businesses in the UK show adeptness at planning and are among the most likely to have both written business plans and documented ICT strategies.
- Similar to businesses in other English-speaking countries, UK businesses prefer the use of informal processes to keep up-to-date with ICT advances.
- UK businesses perceive that staff ICT skills are largely sufficient:
  - 77% of businesses with a technology are either completely or mostly satisfied with employee ICT skill levels;
  - Where shortfalls do occur, *ad hoc* training is the preferred method and little importance is placed upon self-teaching.
- Cost is perceived as the overwhelming barrier to ICT implementation, with set-up costs perceived as more of a hurdle than running costs.

Attitudes of businesses remain positive towards ICT

The vast majority of businesses survey-wide think that online technologies offer benefits

Fig 5.2a Attitude of businesses to online technologies (% of businesses)



Question: "Which of the following best describes the attitudes of your business regarding the technologies mentioned in the survey?"
Base: All businesses
Note: The option "Online technologies could offer significant benefits if deployed properly" was added in 2004, so direct comparisons with 2003 responses are not possible.

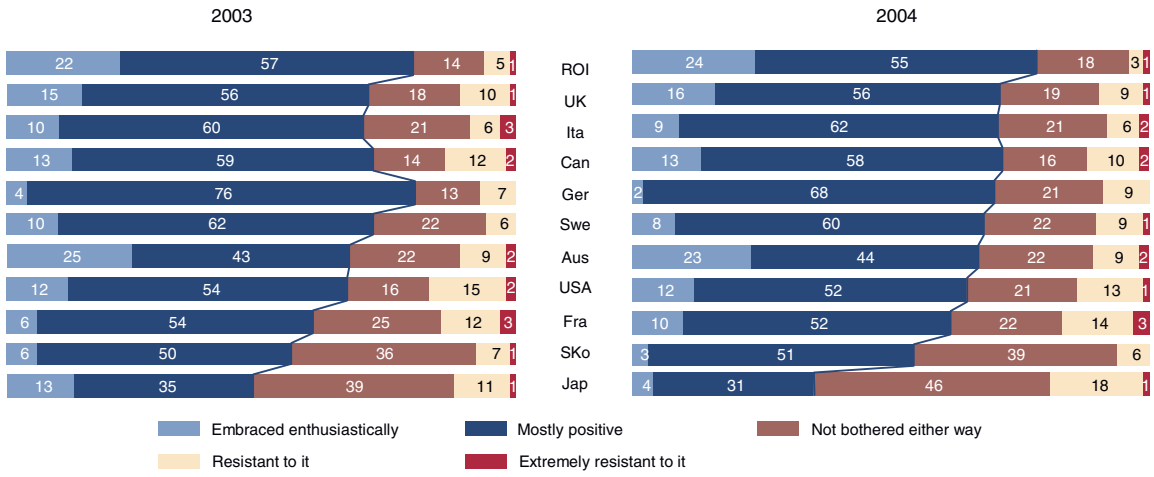
- Businesses remain overwhelmingly positive with 84%(1) (no significant change from 2003) survey-wide expressing the view that online technologies offer "some" or "significant" benefits or that it is "definitely the way forward".
- Japanese businesses are the most positive: 95% expressing a positive attitude towards online technologies.
- Italian businesses remain the least positive towards online technologies – just over a quarter of businesses have not really thought about online technologies or do not believe that they offer any benefits.
- Businesses in the UK remain positive towards online technologies; only 3% of businesses believe that online technologies do not have a useful part to play in their business.

(1) Arithmetic average across all countries surveyed

Attitudes of staff also remain positive towards ICT

Staff attitudes to the introduction of new technologies in general remain positive, the majority of responses recorded were "mostly positive"

Fig 5.2b Staff reaction to new technologies 2003 to 2004 (%)



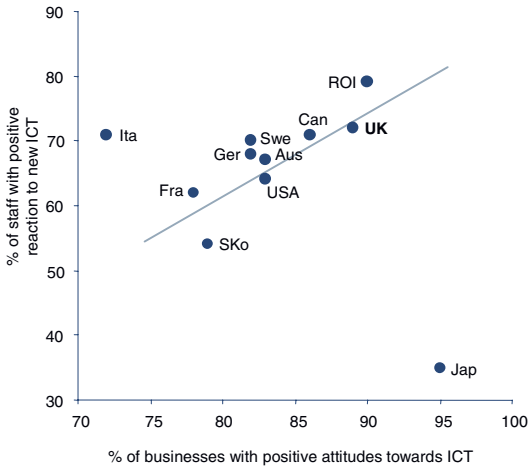
Question: "How do staff react to the introduction of new technologies that they are expected to use?" Options read out.
Base: All businesses with technology and staff, weighted by number of employees

- Staff attitudes are also considered to be generally positive towards ICT – albeit less so than the attitudes of businesses themselves. On average 65%(1) of businesses survey-wide perceive that staff react positively to the introduction of new technologies, down 2 percentage points from 2003.
- Survey-wide no country recorded more than a marginal increase in the proportion of businesses reporting positive staff attitudes.
- The most significant change is seen in Japan where staff are considered more resistant to change for the second year in succession:
  - 19% of staff are considered resistant to new technologies and only 35% are considered positive, less than half that of Ireland, the survey leader;
  - Although with 46% of Japanese businesses are "not bothered either way", it is clear that Japan's position is characterised more by indifference than active resistance.
- Attitudes in Germany have also become more negative; the proportion of businesses reporting staff to have positive attitudes has dropped by 10 percentage points.
- Survey-wide, staff employed in financial services businesses are considered the most likely to react enthusiastically to change.
- UK businesses claim that their staff remain relatively enthusiastic towards ICT, with 72% of businesses with technology and staff having employees either "embracing enthusiastically" or being "mostly positive" to the introduction of new technologies.

(1) Arithmetic average across all countries surveyed

Attitudes of businesses and staff remain positive towards ICT (cont'd)

Fig 5.2c Attitudes of businesses and staff reaction to new ICT (%)



Questions: "Which of the following best describes the attitudes of your business regarding the technologies mentioned in the survey?" and: "How do staff react to the introduction of new technologies that they are expected to use?". Options read out.
Base: All businesses (x axis), All businesses with technology and staff (y axis)

Staff in countries where businesses have a positive attitude towards ICT are generally less averse to change

- There is a strong correlation between positive attitudes of businesses and positive staff response to ICT.
- Japan is the main exception, with a significantly lower number of staff found to react positively to ICT than might be expected given the high number of businesses that express a positive attitude towards ICT.
- The opposite appears to be the case in Italy where staff are in general more positive towards change and ICT than businesses overall.
- Businesses in the UK and Ireland are among the most positive in their attitudes towards ICT and the willingness of staff to react to change.

Discussion of Drivers

- In general, businesses perceive that they have a more positive attitude to change than that of their staff. This implies a communication gap between directors and employees.
- In Japan there is a significant discrepancy between the apparent warming of attitudes of Japanese businesses (Fig. 5.2a) and the cooling of attitudes of their staff (Fig 5.2b). Industry experts in Japan have noted that many Japanese businesses "push" technology onto their staff, often without adequate training or support (see Fig 5.4b). The result is growing dissatisfaction amongst staff and increased resistance to change (see also Figs 5.2d,e).

Businesses' ability to adapt to new ICT remains largely unchanged

English-speaking countries are still more likely to perceive difficulties when implementing ICT change

Fig 5.2d Businesses that reported responding to change with "some difficulties but these can be easily overcome" – 2003 to 2004 (%)

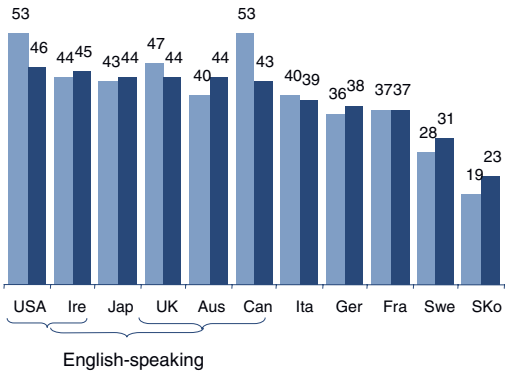
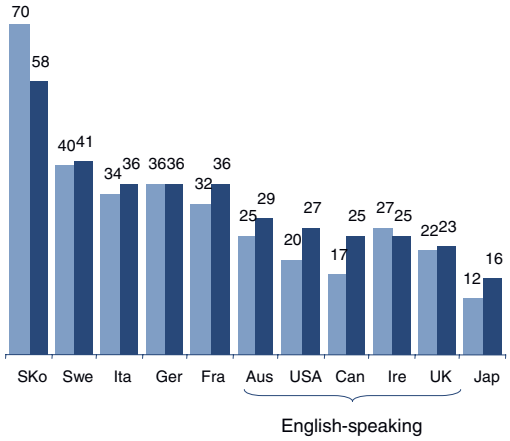


Fig 5.2e Businesses that reported that they "adapt(ed) to change with ease, as a way of life" – 2003 to 2004 (%)



Question: "Which of these most closely describes the way in which you believe your business responds to change?"
Other options included: Change is avoided at all costs, usually a struggle, change rarely presents a challenge, apart from minor problems.
Base: All businesses

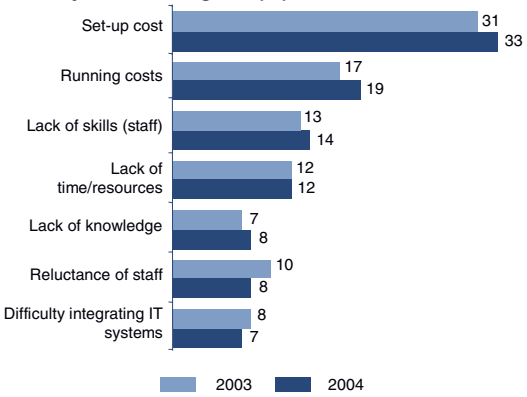
- Last year we noted some apparent cultural differences in attitudes to change:
  - Businesses in English-speaking countries showed a clear tendency to view change as an obstacle, but one that they had to overcome;
  - In contrast, a group of other European countries, led by Sweden, reported that they adapted to change with ease, reflecting cultural differences in their approach to change.
- The 2004 survey confirms this trend. However, Canada and the USA show significant improvement:
  - The proportion of businesses that report to "adapt to change with ease" increased by 8 percentage points in Canada and 7 percentage points in the USA.
- Businesses in South Korea still emerge as the most likely to adapt to change. However, the proportion of businesses that reported they "adapt to change with ease" has fallen from 70% of businesses to 58%. The proportion of businesses reporting some difficulties when implementing change has also risen slightly.
- The UK has one of the lowest proportions of businesses survey-wide that report "to adapt to change with ease" (23% of all businesses), ahead only of Japan.
- Transport and communications and financial services businesses are the most likely to adapt to change with ease.

Discussion of Drivers

- Businesses in the USA and Canada may be becoming better at adapting to change as a result of the upturn in the ICT labour market. As the job market picks up there will be more movement of staff between businesses and greater dissipation of ICT knowledge and best practice. This will tend to increase businesses' propensity for change.
- The decrease in the number of businesses in South Korea that reported they "adapted to change with ease" is most significant amongst micro businesses. This may be an indirect result of the increase in government initiatives aimed at encouraging micro businesses to take on new technology. More micro businesses are implementing sophisticated technologies due to these initiatives with the result that more problems are encountered than when implementing simpler ICT.

Costs remain the major barrier to ICT implementation

Fig 5.2f Barriers to implementing technology 2003 – 2004
Survey-wide averages(1) (%)

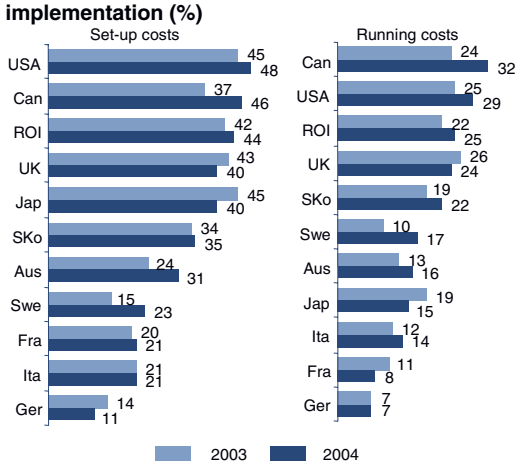


Question: "Can you tell me what has made it difficult for you to implement technology?"
Base: All businesses

Costs are still the most significant barrier to implementing technology

- There have been no significant changes since last year in proportion of businesses reporting each of the main barriers to implementation.
- Difficulty in integrating IT systems remains a relatively minor barrier, and was reported as a barrier to implementation by only 7% of businesses.

Fig 5.2g Businesses perceiving cost as a barrier to ICT implementation (%)

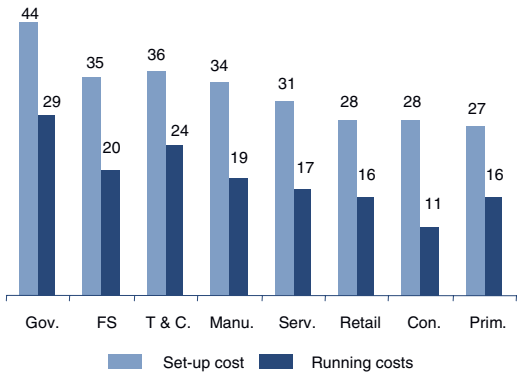


Question: "Can you tell me what has made it difficult for you to implement technology?"
Base: All businesses

Survey-wide, set-up costs are seen as more of a barrier than subsequent running costs

- English-speaking countries are more likely to cite costs, both fixed and variable, as a barrier to ICT implementation.
- The proportion of businesses that perceive costs as a barrier is lowest in Germany, Italy and France.
- In general, both set-up and running costs are perceived as more of a barrier by medium and large businesses than micro and small businesses.

Fig 5.2h Businesses perceiving cost as a barrier to ICT implementation (%) – sector analysis, all countries



Question: "Can you tell me what has made it difficult for you to implement technology?"
Base: All businesses

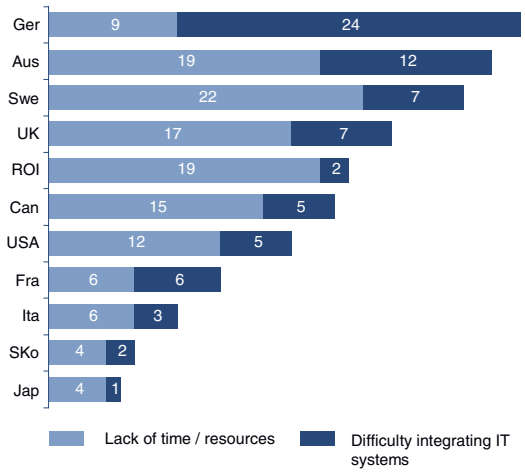
Government organisations are the most likely to perceive costs as a barrier

- Government organisations are the most likely to perceive costs (both set-up and running costs) as a barrier to ICT implementation.
- Businesses with high capital expenditures, such as those in primary industries and construction, are among the least likely to perceive cost as a barrier.

(1) Arithmetic average across all countries surveyed of % of businesses reporting perceiving barrier

Insufficient resources are the next greatest concern

Fig 5.2i Businesses perceiving "functional aspects" as a barrier to ICT implementation (%)

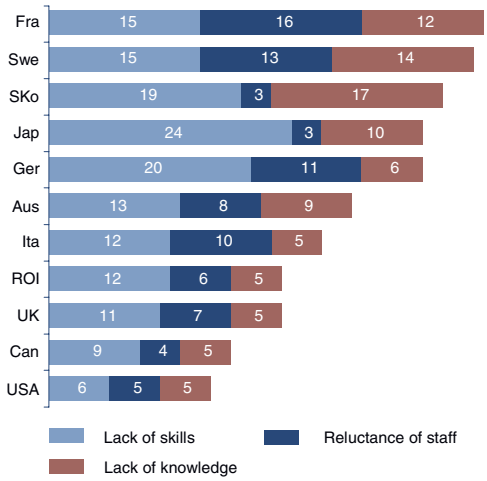


Question: "Can you tell me what has made it difficult for you to implement technology?"
Base: All businesses

In most countries businesses reported lack of time/resources as a greater barrier to implementation than difficulties associated with systems integration

- South Korean and Japanese businesses show extremely low levels of concern for functional barriers.
- The factor most often perceived to hinder ICT development in Germany is difficulty in integrating IT systems.

Fig 5.2j Businesses perceiving "people factors" as a barrier to ICT implementation (%)



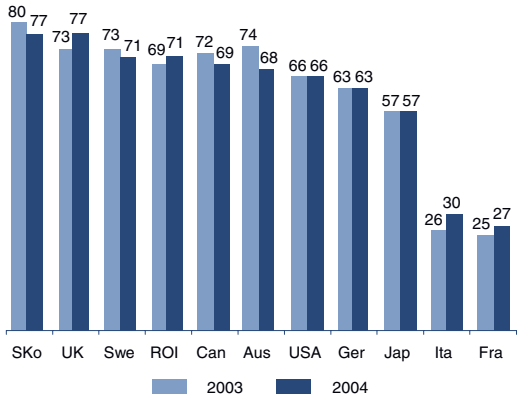
Question: "Can you tell me what has made it difficult for you to implement technology?"
Base: All businesses

People-related implementation barriers are highest amongst businesses in France and Sweden

- People factors, as defined by either lack of skills, staff reluctance or lack of knowledge, are less likely to hinder IT implementation in English-speaking countries.
- Japanese businesses are the most likely to cite lack of skills as a hindrance, mirroring the large number of businesses that are dissatisfied with the skill level of their workforce.
- Lack of knowledge is most frequently reported as a barrier amongst South Korean (17%) and Swedish (14%) businesses.

In most countries surveyed, the majority of businesses have a written business plan, though considerably fewer have a documented IT strategy

Fig 5.3a Does your business have a written business plan (yes's only) - 2003 to 2004 (%)

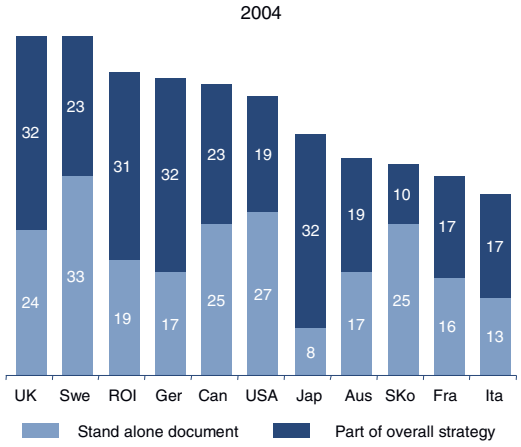


Question: "Does your business have a written business plan?"
Base: All businesses

In most surveyed countries, around two-thirds of businesses have written business plans

- The proportion of businesses with written business plans remains largely unchanged in most countries:
  - Australia was the only country to show a significant change (down 6 percentage points).
- Businesses in the UK and South Korea are most likely to have a written business plan (77%).
- Businesses in Italy and France remain the least likely to have written plans.

Fig 5.3b Businesses with a documented IT strategy (%)



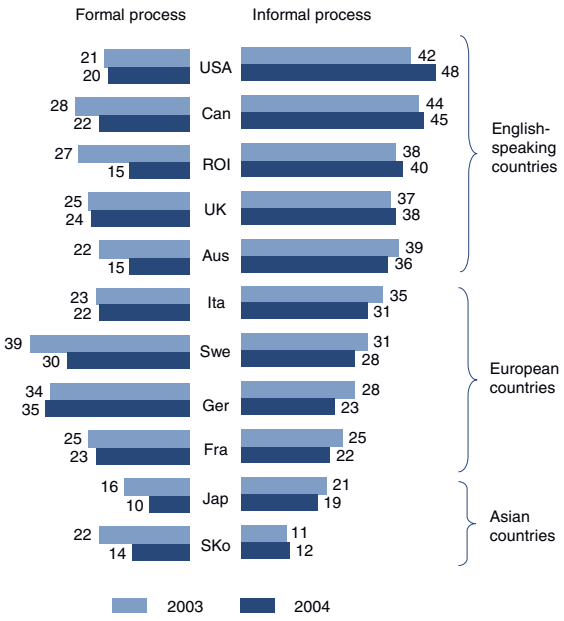
Question: "Does your business have a documented IT strategy?"
Base: All businesses with technology
Note: Yes's only

Significantly fewer businesses have a documented IT strategy

- Businesses from the UK and Sweden are the most likely to have a documented IT strategy.
- In Sweden, South Korea and the USA IT strategies are more likely to be standalone documents than part of the overall strategy.
- Businesses in France and Italy again emerge as the least likely to have documented strategies.
- South Korean businesses are least likely to have a documented IT strategy as part of their overall strategy.

Fewer businesses are using formal processes to keep informed of new or changing businesses processes

Fig 5.3c Keeping informed of new or changing business processes that could benefit business



Question: "How do you usually keep informed of new or changing business processes that could benefit your business?" (If necessary: Business processes are at the very core of your business activities. They drive internal operations, streamline partner interactions and set the business rules for best practices. Well-defined processes form the basis for effective technology implementations)
Base: All businesses
Note: Other responses included "Reliance on external sources"; "No methods of keeping informed"

More businesses survey-wide use informal rather than formal processes to keep up-to-date about new or changing business processes

- English-speaking countries show a marked preference for the use of informal internal processes as opposed to formal processes.
- Survey-wide there is a general decrease in the proportion of businesses that use formal processes:
  - The largest decreases are in Ireland and Sweden.
- This change is reflected in an increase in the number of businesses that reported having no methods of keeping informed:
  - 58% of Japanese businesses report having no methods of keeping informed, an increase of 12% on last year.
- Swedish and German businesses, as in 2003, are the most likely to have a formal "learning process" for keeping aware of new practices.

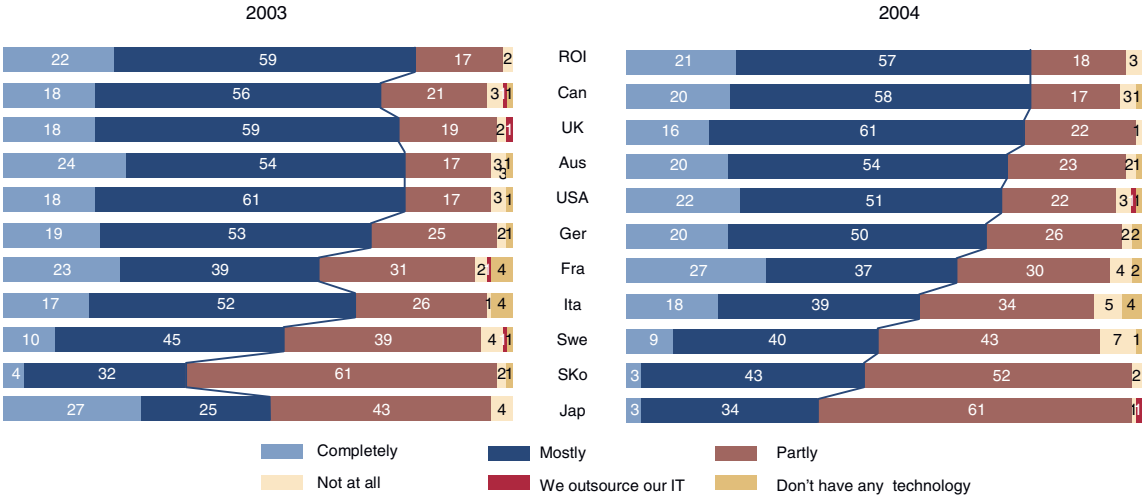
Discussion of Drivers

- The use of informal methods may be highest among English-speaking countries because of the prevalence of the English language within business; in many countries English is now the *de facto* language of business. This has created a strong networking effect.
- In addition, a wide variety of off-the-shelf training related materials are available in English (both online and offline) which reduces the need for businesses in English-speaking countries to use more bespoke formal training resources.

Businesses are mostly satisfied with their employees' IT skills

Businesses generally perceive the IT skills of their staff to be mostly sufficient

Fig 5.4a Do the current IT skills within your organisation meet the needs of the business? - 2003 to 2004 (%)



Question: "Do the current ICT skills within your organisation meet the needs of the business?"
Base: All businesses with technology

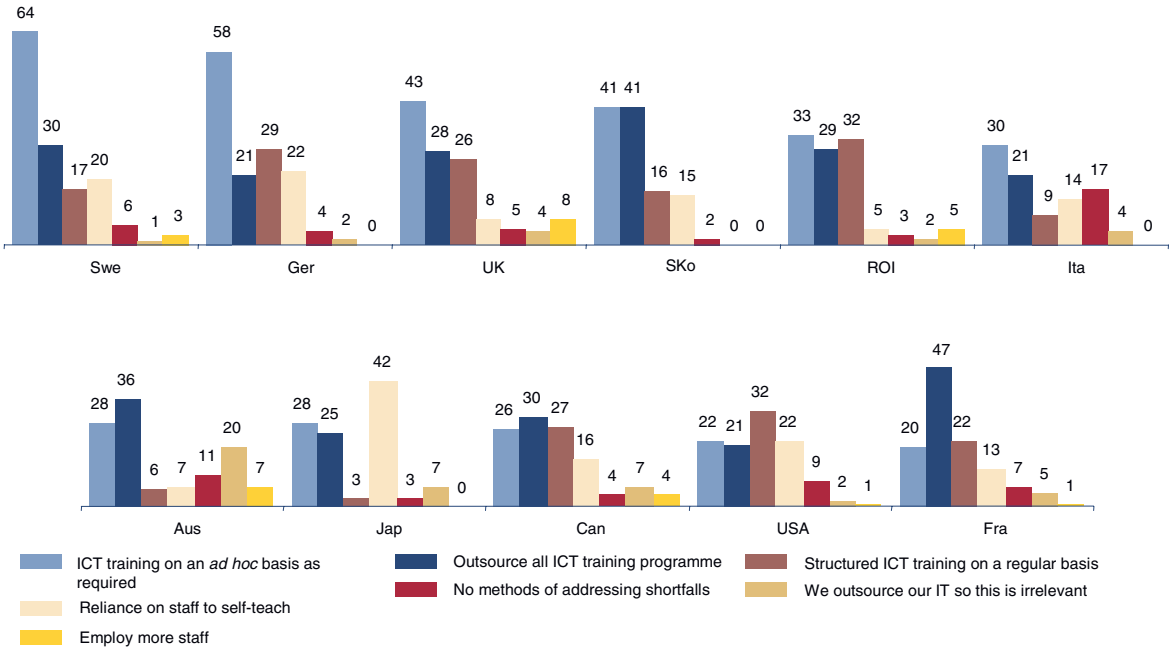
- Survey-wide there is significant variation in the proportion of businesses that are either completely or mostly satisfied with the current IT skills of their staff.
- Businesses in English-speaking countries tend to express the most positive opinions about the skills of their staff, with between 70% and 80% of businesses with technology reporting that IT skills either completely or mostly satisfy the needs of the business.
- South Korean and Japanese businesses, in contrast, are generally dissatisfied with the current IT skills of their staff:
  - Only 37% of businesses with technology in Japan report being either completely or mostly satisfied, a 15 percentage point decrease since 2003;
  - This is consistent with the relatively high proportion (24%) of businesses in Japan that regard lack of skills to be a barrier to the implementation of ICT and the sharp decrease in the number of staff that react enthusiastically to change.
- The high levels of satisfaction amongst businesses in the UK and Ireland is consistent with the finding that staff in these countries react positively to the introduction of new technologies.

Discussion of Drivers

- Among Japanese businesses the high levels of dissatisfaction may be due to an increased reliance on internal staff for ICT implementation (32% of Japanese businesses with technology use internal staff only to implement ICT projects, up 12 percentage points from 2003 and 5% use external contractors only, compared with 13% in 2003), and the requirement for increasingly sophisticated skills to meet ever-more complicated IT requirements.

Businesses are more likely to address skills shortfall through *ad hoc* training than structured training

Fig 5.4b How businesses address ICT skills shortfalls 2004 (%)



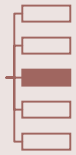
Question: "How does your business usually address any ICT skills shortfalls it might experience?"
Base: All businesses with skills shortage

- The approach used by businesses to address a skills shortage varies significantly by country and by sector:
  - The majority of businesses with a skills gap show a preference for internal (structured and *ad hoc*) options rather than outsourcing;
  - Financial services businesses and government organisations are the most likely to provide structured ICT training on a regular basis.
- *Ad hoc* training is the most common approach among businesses in Sweden, Germany, the UK, Italy and Ireland:
  - The main benefits of this type of training are typically greater flexibility and lower fixed costs.
- Japanese businesses place the strongest emphasis on self-teaching. The large proportion of businesses not content with employee ICT skills and growing disaffection of staff towards ICT suggest that this method may be less effective than alternative training approaches.
- Outsourcing of ICT training is highest in France, South Korea and Australia.
- 17% of Italian businesses and 11% of Australian businesses with skills shortages purport to have no methods of addressing ICT skills shortfalls.
- Businesses in the UK are the most likely to hire more staff to address an ICT skills shortage.

6. Technology and Adoption

6. Definition

Technology and Adoption refers to the extent to which businesses are connected and have adopted ICT



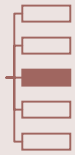
Technology and Adoption

- The extent to which businesses are connected, and have adopted ICT

Criteria: to score highly, a country needs	Measurement indicators (1)
High levels of connectivity among its businesses	*Connectivity composite.* % of businesses with Internet. % of businesses with a website. Method of connection to the Internet. Bandwidth of connection to the Internet.
Focus 6i	Variation in the level of ICT deployment across sectors
High adoption of ICT by businesses	*% of businesses with internal e-mail.* *% of businesses with external e-mail.* % of businesses with LAN. % of businesses with WAN. *% of businesses with an Intranet.* % of businesses with an Extranet. % of businesses with interactive telephony. % of businesses with EDI. % of businesses using video conferencing. % of businesses using desktop video conferencing.(2) % of businesses with remote / mobile terminals. % of businesses with remote synchronised terminals. % of businesses with wireless LANs. % of businesses with wireless WANs. % of businesses with computerised process control % of businesses using VoIP(2) *Regularity of website updating.* *Non-connected businesses' aspirations to access the Internet.* *Non-connected businesses' aspirations to have a website.* *Non-connected businesses' aspirations to use external e-mail.*
Focus 6ii	Security – a growing concern.

(1) All indicators relating to Technology and Adoption are listed. Those not directly addressed within this chapter are written in italics.
(2) New in 2004 survey - VoIP is a technology which allows voice calls to be made over a data network, either through a switchboard or direct to a desktop.

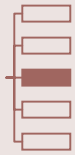
Technology and Adoption refers to the extent to which businesses are connected and have adopted ICT (cont'd)



Definition

- "Technology and Adoption" refers to the extent to which businesses are connected and have adopted ICT.
- High levels of connectivity among businesses may for example be marked by:
  - Businesses which have Internet access and a website;
  - Businesses which have increasingly sophisticated methods of connection to the Internet;
  - Businesses which have high bandwidth, reaching 10 Mbps or greater;
  - Businesses which employ more advanced technologies, from LANs and WANs to video conferencing and EDI.

Businesses are demanding greater bandwidth but are still wary of mobile technologies



Overall findings and key themes

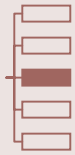
Internet access levels among businesses remain stable, however, access speeds are continuing to rise

- The proportion of businesses with internet access and a website is reaching a plateau in most countries.
- The trend of "clicking-off" among micro businesses identified in last year's IBS appears to be changing:
  - In the UK there has been a clear reversal of 2003 results: the proportion of micro and small businesses with a website in the UK grew on average 16 percentage points in 2004, compared with a drop of 4 percentage points in 2003, driven by lower connectivity costs and more packages tailored to the needs of smaller businesses;
  - In other countries the movement is less clearly defined.
- Survey-wide there has been a steady increase in the adoption of broadband technologies as businesses demand faster connections and higher quality of service:
  - Over 50% of businesses have upgraded their connection speed in the last 2 years.
- In contrast, adoption of mobile technologies has been slow, and has even declined in some countries, for reasons examined later in the chapter.

Leading nations

Sweden, South Korea, Japan and Ireland have the highest levels of technology and adoption

- Overall, Sweden scores consistently highly across the full range of technology and adoption metrics such as the proportion of businesses with websites, usage of EDI, and adoption of mobile technologies.
- Businesses in South Korea and Ireland are the most connected in terms of internet access.
- Japan is the clear leader in terms of connection speed, with 50% of businesses reporting connections speeds of over 10 Mbps, almost twice the proportion in the next highest nation, South Korea.
- Use of VoIP is highest amongst businesses in South Korea, Ireland and the UK.



The UK has shown significant increases in levels of ICT adoption

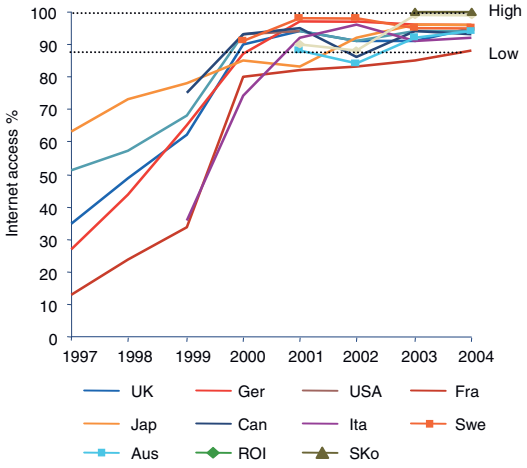
UK position **The UK has seen significant advancement in the level of ICT adoption, particularly amongst smaller businesses**

- The proportion of businesses with a website and the proportion of businesses using e-mail both grew 5 percentage points.
- Around two thirds of businesses now have access to broadband, up 10 percentage points from 2003:
  - Adoption of xDSL has risen by 11 percentage points and it is now used by 24% of businesses;
  - The proportion of businesses with access speeds above 2 Mbps has increased significantly from 26% to 41% of businesses, although the proportion of businesses with access speeds of over 10 Mbps has remained stable (around 5% of businesses).
- Adoption of networking technologies has grown steadily and the UK is now the leading adopter of wireless LANs:
  - 83% of UK businesses have a LAN (up 6 percentage points from 2003);
  - 58% have a WAN (up 6 percentage points), second to Sweden at 61%;
  - 28% have a wireless LAN.
- Growth in the level of ICT adoption has been highest among micro and small businesses:
  - The number of micro businesses in the UK with a website increased by 16 percentage points;
  - The number of micro businesses using external e-mail grew by 20 percentage points;
  - According to Ofcom, the proportion of SMEs connected to broadband more than doubled between February 2003 and February 2004.(1)
- Levels of ICT adoption vary by sector:
  - Adoption of ICT is highest among government and financial services organisations and is lowest among construction and primary businesses;
  - Average adoption rates for ICT by sector in the UK are generally above the sector averages for the rest of the countries surveyed.

(1) The Ofcom Internet and Broadband Update, April 2004

The proportion of businesses with internet access and a website is stabilising in most countries

Fig 6.2a Internet access (%)

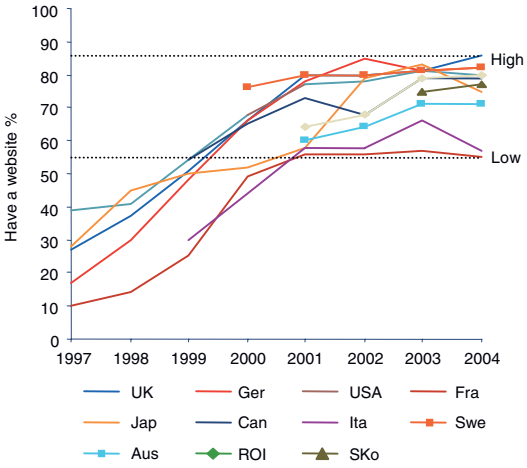


Question: "Does your business have internet access?"
Base: All Businesses

Around 95% of businesses in the majority of countries surveyed have internet access

- Levels of access to the Internet are approaching saturation for most countries.
- There are small differences in the levels at which countries are stabilising. These are the result of a range of local factors such as the population density, concentration of competition, and core technological infrastructure.
- France still has comparatively low uptake, at 88%, with relatively slow progress being made year on year.

Fig 6.2b Website deployment (%)



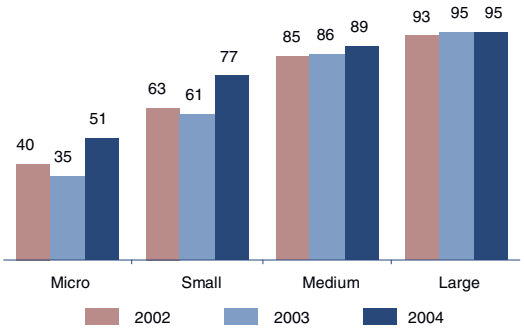
Question: "Does your business have a website?"
Base: All Businesses

There has been little change in the number of businesses with a website in most countries

- In most countries, the proportion of businesses with a website remains stable between 55%-85% of all businesses.
- In Japan and Italy there has been a decline in the number of businesses with a website:
  - In Japan the decline was most significant amongst small and medium sized businesses;
  - In Italy the decline was greatest among micro and small sized businesses.
- Growth in the number of businesses with a website has been highest in the UK as a result of significant increases among micro and small-sized businesses (both up 16 percentage points).

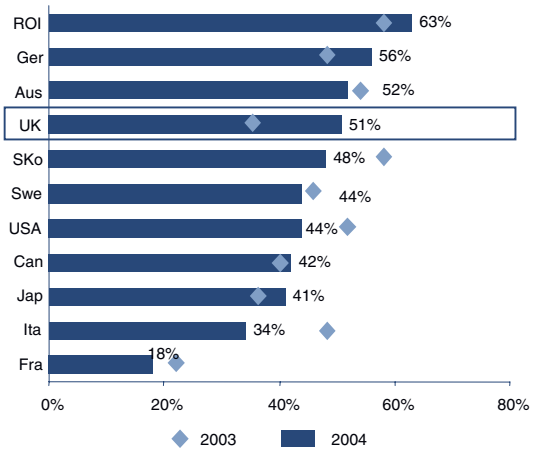
In the UK, website deployment amongst micro and small businesses has increased significantly

Fig 6.2c Businesses with a website by firm size (UK) (%)



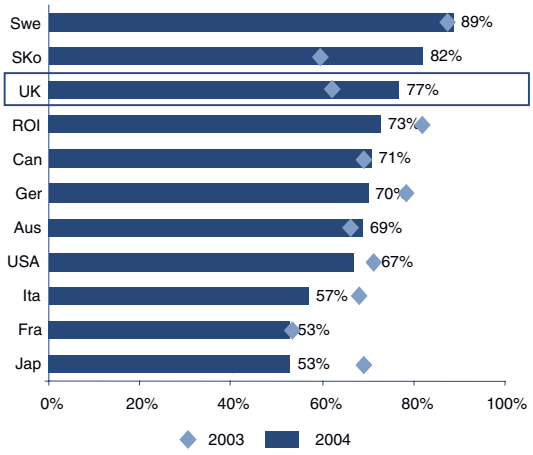
Question: "Does your business have a website?"
Base: All Businesses

Fig 6.2d Micro businesses with a website 2004 (%).



Question: "Does your business have a website?"
Base: All Businesses

Fig 6.2e Small businesses with a website 2004 (%)



Question: "Does your business have a website?"
Base: All Businesses

UK micro and small businesses are re-establishing a web presence

- There has been a marked increased in the proportion of micro and small businesses with a website.
- This suggests that the digital divide between larger and smaller businesses, identified in last year's survey, is now closing.
- Falling prices of website design, lower connection costs, and a better understanding of the potential benefits have made the business case for establishing a website more compelling for smaller businesses.

The proportion of UK micro businesses with a website is up, but still below that of leading nations

- Ireland and Germany have the greatest proportions of micro businesses with a website.
- The UK and Germany have shown the greatest increases in the percentage of micro businesses with a website since 2003.
- Italy has experienced the greatest drop, with the proportion of micro businesses with a website falling 14 percentage points.

The survey-wide average of the proportion of small businesses with a website has not changed significantly

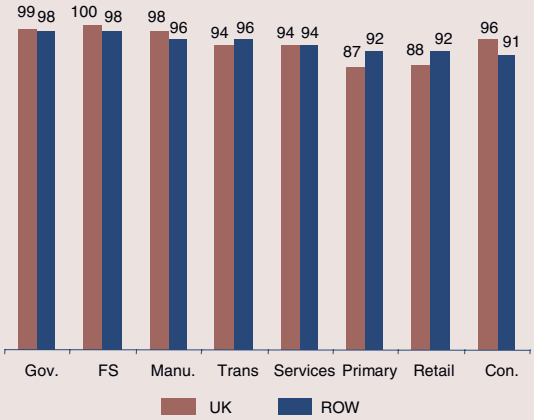
- On average, the proportion of small businesses with a website has hardly changed. However, there have been significant variations in several countries.
- The proportion of small businesses with a website has increased most significantly in South Korea (up 24 percentage points) and the UK (up 16 percentage points).
- With the exception of the UK, there is little correlation between countries in changes in the proportion of small businesses with a website (Fig 6.2e) and changes in the proportion of micro businesses with a website (Fig 6.2d).

Focus 6i

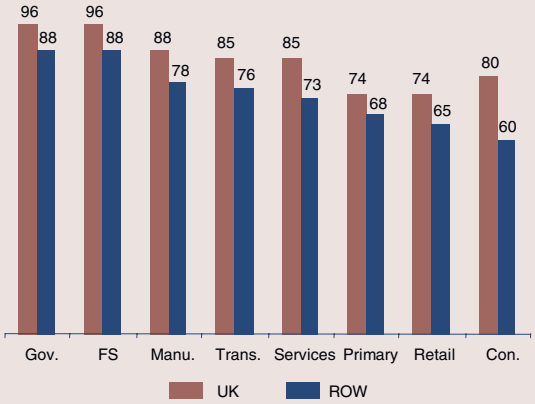
Variation in the level of ICT deployment across sectors

Level of ICT adoption by sector

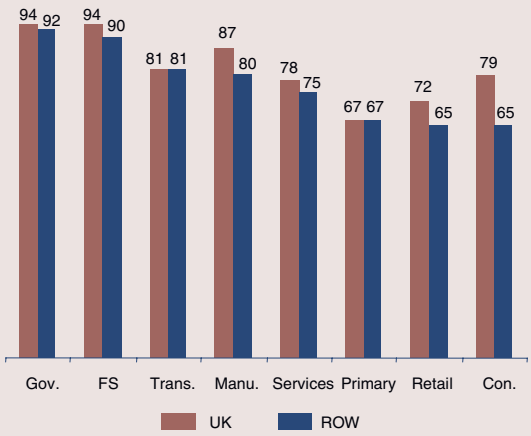
Internet Access



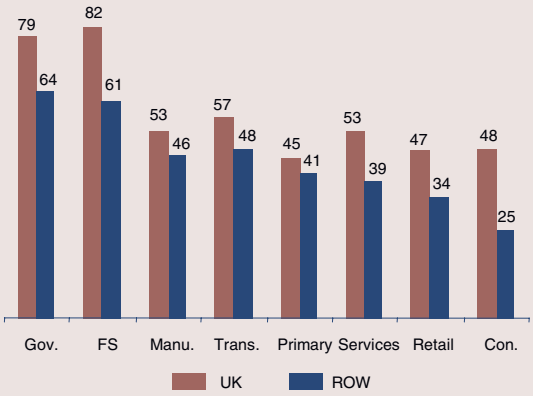
Website



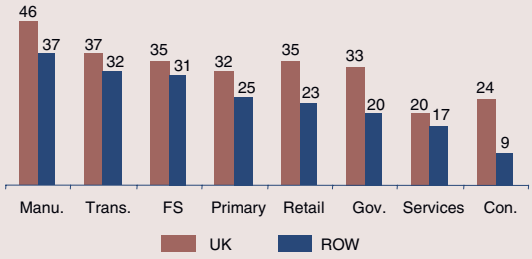
LAN



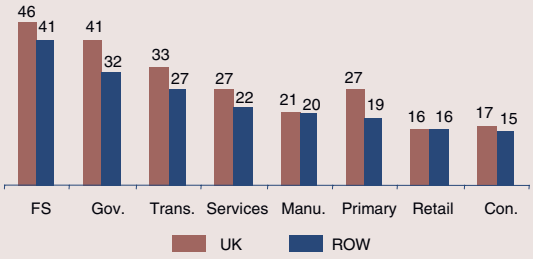
WAN



EDI



Extranet

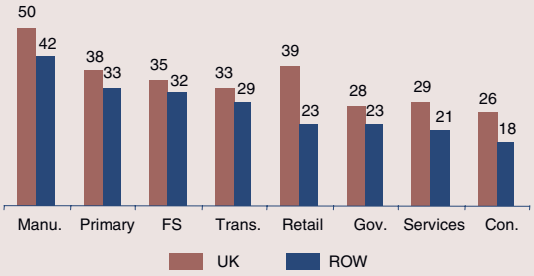


Focus 6i

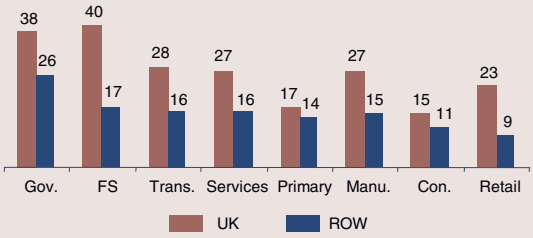
Variation in the level of ICT deployment across sectors (cont'd)

Level of ICT adoption by sector

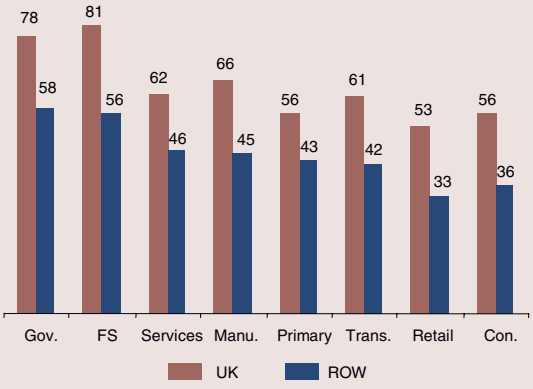
Computerised process control



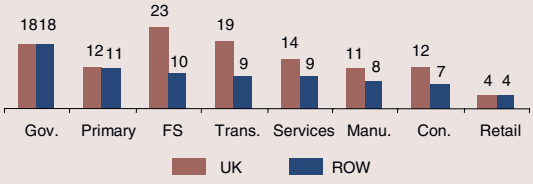
Wireless LAN



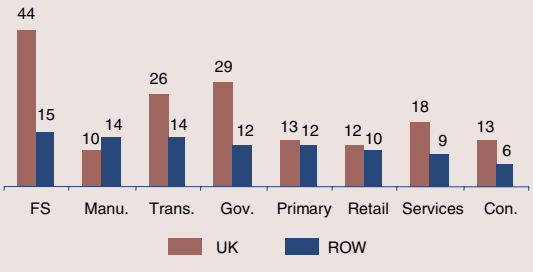
Remote or mobile terminals



Desktop Video conferencing



VoIP



Abbrev.	Sector	Description
Gov.	Government	Public administration, education, Health care
FS	Financial services	Banking, insurance, pensions
Manu.	Manufacturing	Food, drink, tobacco, textiles, clothing, motor vehicles, furniture
Trans/ comms	Transport and communication	Freight, post, telecoms
Services	Services	Accountants, advertising, computing activities, estate agents, legal services, vehicle hiring
Primary	Primary industry	Agriculture, chemicals, mining, utilities
Retail	Retail / wholesale	Distribution, repairs, hotels, catering
Con.	Construction	Construction

Variation in the level of ICT deployment across sectors (cont'd)

In general, there are significant differences in the level of ICT deployment for each of the eleven technologies tested in this Focus section

- Adoption of ICT is highest among government organisations and financial services businesses.
- The adoption of "basic" connectivity and networking technologies (Internet, Website, LAN and WAN) follow a similar pattern across sectors:
  - In general, government and financial services businesses have the highest levels of adoption;
  - Businesses in the retail and construction sectors typically have the lowest levels of connectivity and adoption.
- Use of EDI and computerised process control is highest within the manufacturing sector.
- Sector averages in the UK are generally above the overall sector averages for the other 10 countries surveyed.
- Deployment of ICT by the construction sector in the UK is on average significantly higher than in other countries.
- Similarly, uptake of mobile technologies is significantly higher amongst UK financial services businesses than the average in other countries.

Discussion of drivers

- The significant variation across sectors in the level of ICT adoption can largely be attributed to the inherent differences in general business processes, which typically have different ICT requirements. Construction businesses generally do not need the same sophisticated CRM and back office systems required by a financial services organisation. Similarly, services businesses generally do not require the same level of computerised process control as manufacturing businesses.
- Financial services businesses typically have the greatest need for network technologies such as WANs and Extranets. Latency, quality of service and security are the most significant concerns for these businesses.
- Regulatory changes also drive adoption: increasingly stringent environmental regulations concerning "cradle to grave" product stewardship are forcing manufacturing companies to adopt more sophisticated tracking processes.
- Businesses in low margin sectors, such as retail, are often the most cost conscious and the least likely to pay a premium for enhanced functionality. "Many retailers are operating DOS (disk operating system) based systems very successfully and see no reason to upgrade".(1)
- The differences in the levels of ICT adoption across sectors are largely consistent with those identified in a recent study by Clayton and Waldron(2) who also found that construction businesses typically have the lowest levels of connectivity and financial services businesses the highest usage.

(1) Director of leading ICT provider
(2) Clayton, T. and Waldron, K (2003), "E-commerce Adoption and Business Impact, A Progress Report", Economic Trends

Connection speeds typically range from 56 Kbps for a dial-up connection to 155 Mbps for leased lines and satellite connections

Fig 6.2f Connection technology overview

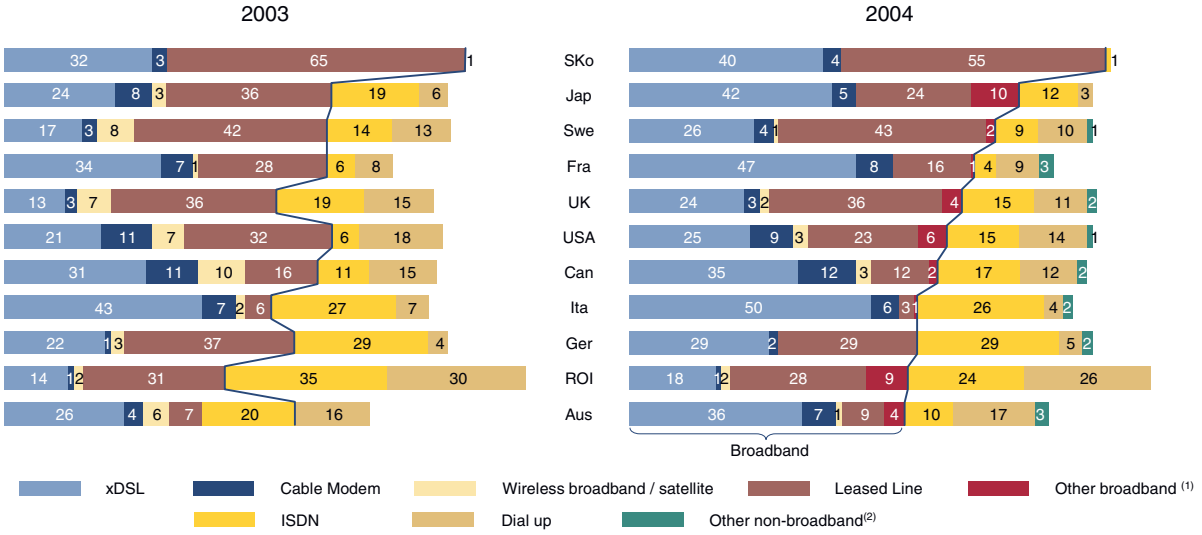
	Technology	Description	Prime Applicability	Typical Band Width(1)	Trend	
Older Technologies	Dial Up	Data transmission over a single analogue telephone line using sophisticated modulation and compression techniques	Small business	> 56 Kbps	↓	
	ISDN	Data transmission using the digital format of the ISDN standard using 1, 2 or multiple channels	Small and Medium business	> 128 Kbps	↓	
	Leased Line	Connection over a transparent, dedicated digital line	Medium / Large business; provision by players such as Global Crossing	2 Mbps – 155 Mbps	↓	"Broadband"
Emerging Technologies	xDSL	Connection using copper telephone line, but with optimised transmission format allowing greater bandwidths than ISDN or dial-up	Near a local exchange; good for short distances	512 Kbps – 2 Mbps	↑	
	Cable	Internet-enabled cable TV connection - enabling requires the line to be used bi-directionally	In an area covered by a cable organisation, e.g. NTL, Telewest	>512 Kbps	↑	
	Wireless / Satellite	Using a bi-directional link via satellite to transmit data at high speeds – a large variety of standards exist	Remote business/rural communities	256 Kbps – 155 Mbps	↑	

(1) Actual bandwidth provided may be lower, at discretion of supplier

xDSL penetration is increasing in all countries surveyed

Adoption of xDSL is increasing across the board whilst adoption of cable remains largely unchanged

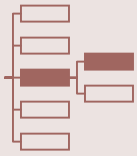
Fig 6.2.g Method of connection to the internet (%)



Question: "How is your Internet connection provided?"
Base: All businesses

- Growth in xDSL has been particularly strong in the UK, Japan and France, mainly as a result of infrastructure improvements by incumbents:
  - France and Italy still the have highest proportion of businesses connected by xDSL (around 50% of businesses).
- The growth in xDSL has resulted in the displacement of older dial-up and ISDN technologies.
- Cable penetration remains largely unchanged and is highest in Canada (12%).
- Usage of leased lines has also fallen in most countries:
  - Some businesses that were using leased lines have switched to alternative broadband technologies such as xDSL because they are less costly and still offer sufficient levels of performance and security.
- South Korea is still the only country surveyed where almost all the businesses have broadband internet access: 55% of businesses have leased line access, 40% xDSL, and 4% cable modem.
- The level of xDSL penetration in the UK is still below that of the leading countries, despite an increase of 11 percentage points in the number of businesses using xDSL. However, local loop unbundling could help increase penetration in xDSL and deliver the same kind of growth emerging in, for example, France and Japan, where tens of thousands of local loops are unbundled each month (3).

(1) Other broadband includes Fibre, CDN, Radio Link, Frame relay line, Janet, BFLETS and VPN
(2) Other unspecified connections (non-broadband)
(3) Ofcom: The Communications Market 2004 - Telecommunications



xDSL penetration is increasing in all countries surveyed (cont'd)

Discussion of drivers

- Growth in broadband penetration is driven by shifts in both supply and demand:
- On the supply side, increasing levels of competition between service providers is driving down prices in many countries, making broadband a viable option for many more businesses:
  - Broadband prices have dropped most significantly for connection speeds above 512 Kbps (see Fig 6.2i)(1);
  - Regulatory changes reducing the power of fixed-line incumbents has prompted the entrance of new providers(2);
  - Government initiatives, such as the Metropolitan Area Network (MAN) programme in Ireland and the ACT NOW project in Cornwall, England are increasing penetration within rural areas and encouraging greater private sector investment.
- On the demand side, businesses are becoming more hungry for bandwidth:
  - Average file sizes are increasing as content becomes richer;
  - Businesses are increasingly moving to Internet based computing;
  - New and emerging applications, such as VoIP, require fast connections and high quality of service (QoS)(3) to operate effectively.

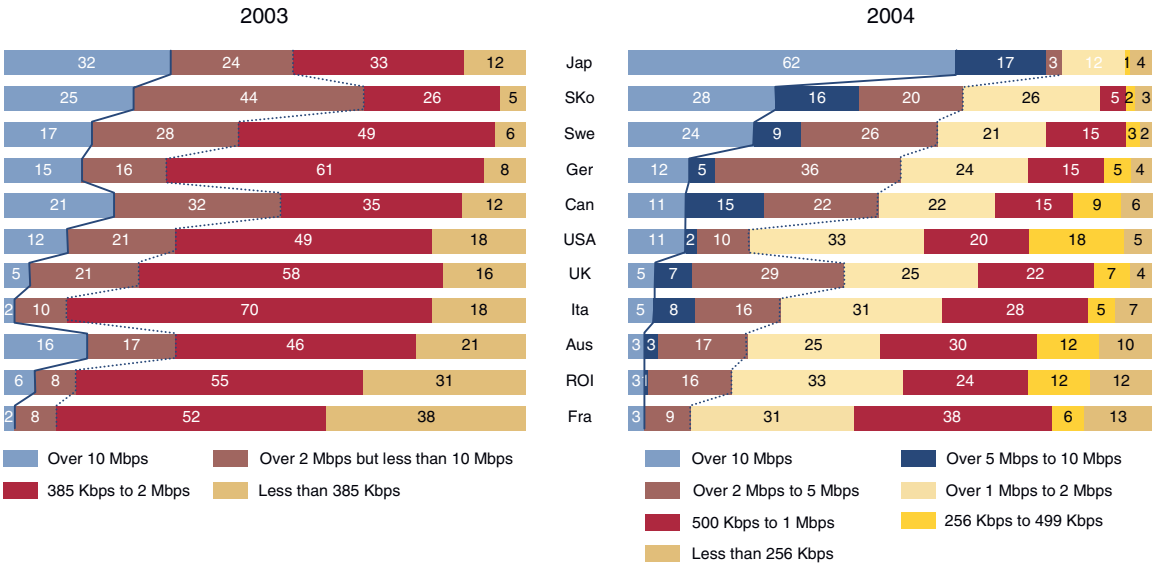
Fig 6.2h Percentage change in price levels between August 2003 and April 2004 – business services(1)

Country	> 257 Kbps	>512 Kbps
France	-47%	-67%
Germany	-20%	-22%
Sweden	-7%	-7%
UK	-2%	-36%
USA	-30%	-40%

(1) Ofcom: The Communications Market 2004 - Telecommunications
(2) http://www.ectaportal.com/regulatory /2004scorecard.zip
(3) Quality of Service (QoS) is a networking term used to define the transmission and error rates and levels of network performance.

Connection speeds have also increased significantly

Fig 6.2i Speeds of internet access (%)



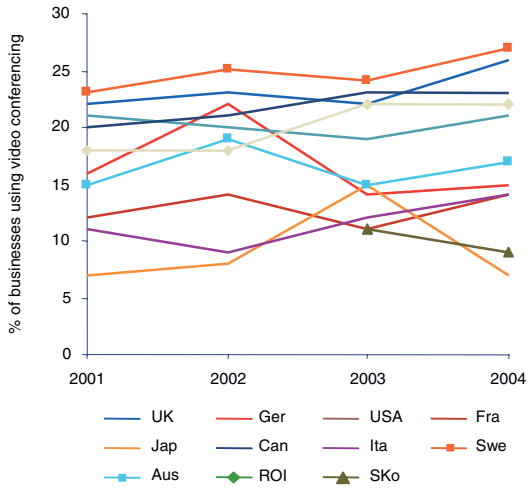
Question: "..and what bandwidth do you have?"
Base: All businesses using "Broadband" connection technology (xDSL, cable, leased line, wireless/satellite)
Note: New categories were introduced in 2004

- Most countries have seen a rise in the proportion of businesses using broadband with internet connections with a bandwidth greater than 2 Mbps.
- Japan has seen the most dramatic rise and has overtaken South Korea as the nation with the fastest internet access:
  - 82% of Japanese businesses using broadband reported having a connection speed of over 2 Mbps, and 62% with over 10 Mbps;
  - This has been driven in part by the rapid adoption of NTTWest's BFLETs, a best-effort network service(1) which connects subscribers via optical fibre to a compatible Internet service provider (ISP) and Yahoo Japan's BB Phone internet protocol (IP) service.
- Italy has seen the most dramatic increase, the number of businesses using broadband with a connection speed of over 2 Mbps has more than doubled.
- In the UK, the proportion of businesses with fast access (over 10 Mbps) has remained stable (around 5% of businesses using broadband) but the proportion of businesses with access speeds above 2 Mbps has increased significantly from 26% to 41% of businesses using broadband.
- Businesses using broadband in France have the lowest access speeds available - 88% rely on connections of less than 2 Mbps.

(1) Best-effort network services do no guarantee data rates and have varying connection speeds depending on network congestion

Adoption of video conferencing remains low in most countries

Fig 6.3a Business Video Conferencing (%)

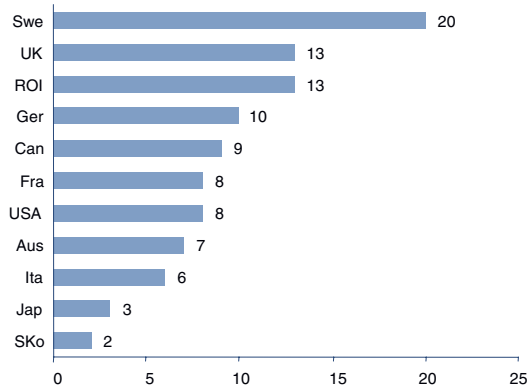


Question: "Does your business have or use Video Conferencing?"
Base: All Businesses

Uptake of video conferencing is increasing slowly, but remains low

- In general, uptake of video conferencing is highest amongst English-speaking countries.
- Surprisingly, adoption appears to have fallen in the two countries with the highest broadband penetration - Japan and South Korea. One reason for this may be that the critical mass of business users required for video conferencing to be beneficial has not yet been reached, leading to early adopters abandoning it.

Fig 6.3b Desktop Video Conferencing (%)



Question: "Does your business have or use desktop video conferencing, such as NetMeeting?"
Base: All Businesses

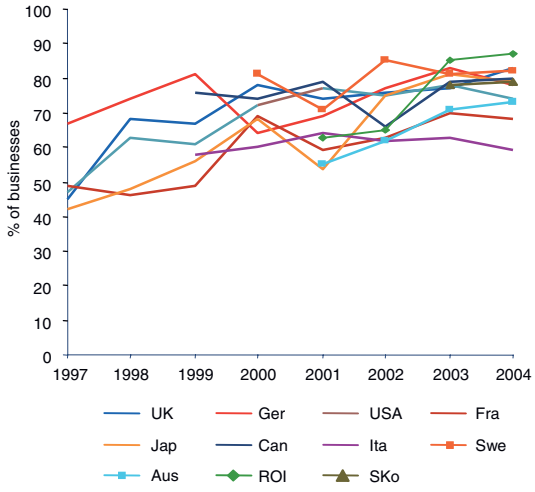
Uptake of desktop video conferencing is highest in Sweden, the UK and Ireland

- Adoption of desktop video conferencing, measured for the first time this year, is still less than the adoption of traditional video conferencing (Fig 6.3a) in all countries.
- Adoption is highest in Sweden, with a fifth of businesses now using it.
- Uptake is lowest in Japan and South Korea.

Basic LAN and WAN uptake has largely stagnated

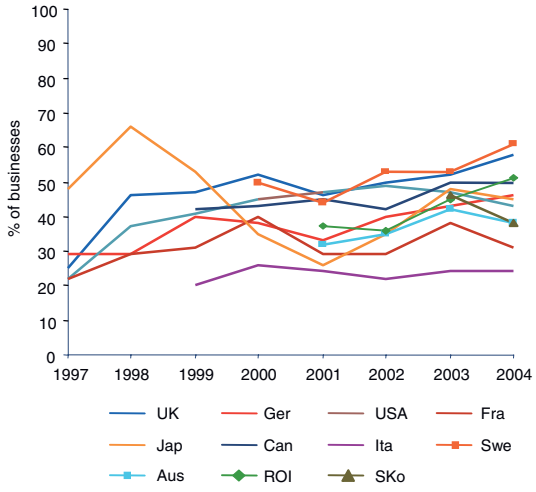
The uptake of LANs is stabilising whilst the uptake of WANs is more varied

Fig 6.3c LAN (%)



Question: "Does your business have a *LAN*?"
Base: All businesses

Fig 6.3d WAN (%)



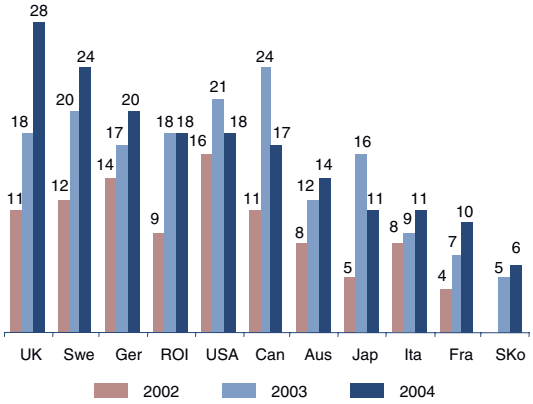
Question: "Does your business have a *WAN*?"
Base: All businesses

- In general, the uptake of LANs appears to be stabilising:
  - In most countries there are only marginal changes in the proportion of businesses using LANs, in contrast to the significant growth between 2002 and 2003.
- Italy still has the lowest adoption of LANs (59% of businesses) and Ireland the highest (87%).
- Uptake of WANs is mixed: adoption has declined in South Korea, France, Australia, Japan and the USA and increased in the UK, Ireland, Sweden and Germany.
- As one would expect, adoption is highest amongst amongst large businesses:
  - On average(1) 76% of large businesses have a WAN;
  - 47% of medium sized businesses;
  - 21% of small businesses; and only
  - 11% of micro sized businesses.
- 83% of UK businesses have a LAN (up 6 percentage points from 2003); 58% have a WAN (up 6 percentage points) the second highest proportion, behind Sweden at 61%.

(1) Arithmetic average across all 11 countries

Adoption of mobile technologies has been mixed, increasing rapidly in some countries but declining in others

Fig 6.3e Wireless LAN (%)



Question: "Does your business have a Wireless LAN?"
Base: All businesses

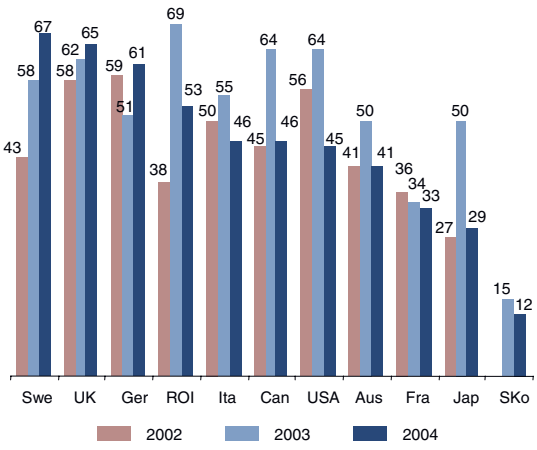
Wireless LAN adoption has continued to increase in most countries, but declined in others, including Canada, Japan and the USA

- Adoption of wireless LANs has increased dramatically in the UK which is now the leading adopter, with 28% of businesses reporting wireless LAN use.
- However, there has been a decline in adoption in other countries, including Canada, Japan and the USA:
  - The decline in Canada is especially surprising since, according to some commentators, wireless LANs had already achieved a critical mass of users.
- Adoption is still highest amongst large businesses, although the difference in uptake between small and large businesses has decreased.

Discussion of drivers

- The decline in the USA and Canada can in part be attributed to increased security concerns (examined in more detail in Focus 6ii).
- In addition, according to one industry expert, many businesses using wireless LANs in the USA and Canada have not realised the operational benefits that they had initially hoped for (such as increased workforce flexibility and mobility within the office). As these businesses were typically earlier adopters, we might expect to see similar declines over the coming years in other countries.
- There is considerable hype and publicity in many countries about emerging next generation wireless LAN technologies; businesses may be waiting for these to become available before investing.

6.3f Remote or mobile terminals (%)



Question: "Does your business have or use remote or mobile terminals?"
Base: All businesses
Note: The words "such as PDAs, Laptops, WAP-phones" were added to the question in 2004

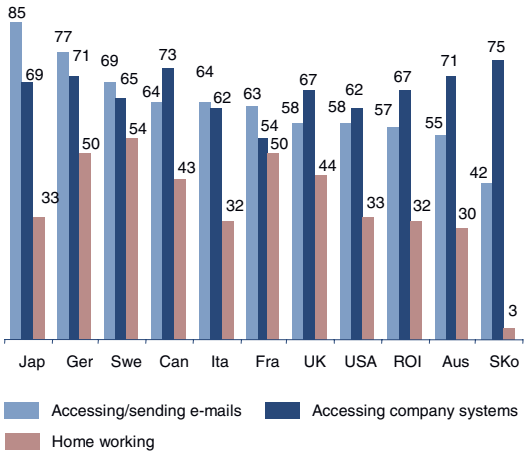
(1) The European Information Technology Observatory 2004 (EITO)

The proportion of businesses using remote or mobile terminals has also fallen in several countries

- Use of remote and mobile terminals appears to have fallen sharply in Ireland, Canada, the USA and Japan.
- In contrast, usage has increased in Sweden, the UK and Germany.
- Adoption in South Korea remains very low, with only 12% of businesses reporting use of remote or mobile terminals.
- According to EITO(1), the main inhibitors restricting the adoption of mobile technology in Europe are security concerns, insufficient data speeds, and cost. The decrease in usage may be a result of an increasing realisation of these factors.

Many businesses use remote or mobile terminals to access company systems and to access/send e-mails. VoIP is also widely used.

Fig 6.3g Uses of remote or mobile terminals by businesses (%)

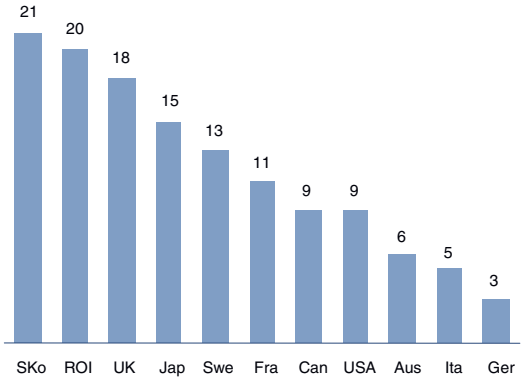


Questions: "Specifically, what do you use remote or mobile terminals for, other than making normal voice calls?"
Base: All businesses that answered yes to: "Does your business have or use remote or mobile terminals, such as PDAs, Laptops, WAP-Phones"

The main uses of remote or mobile terminals other than voice calls are for accessing company systems and accessing/sending e-mails

- Businesses in Japan and Germany with remote or mobile terminals are the most likely to use these terminals to access or send e-mails.
- Use of remote or mobile terminals for home working remains low, especially in South Korea.
- There is no clear correlation between uses of remote and mobile technologies by businesses in different countries and overall levels of adoption.

Fig 6.3h Businesses using VoIP (%)



Question: "Does your business have or use VoIP?"
Base: All businesses

VoIP, measured for the first time this year, is already used by a fifth of businesses in South Korea and Ireland

- Adoption is highest in South Korea, where VoIP is used by 21% of businesses.
- The UK is amongst the leading countries, behind Ireland:
  - Within the UK, there is significant variation by sector (see Focus 6i);
  - 44% of financial services use VoIP compared with only 10% of manufacturing businesses.
- Adoption in the USA and Canada, despite having high broadband penetration, has been significantly lower:
  - One reason for this may be the very low cost of long distance calls in both these countries.
- Adoption has been slowest in Australia, Germany and Italy.

Focus 6ii

Security concerns are rising

Background

- Survey-wide online security[1] appears to be a growing concern amongst businesses:
  - Expenditure on security related products and services has grown steadily as more businesses become the victim of security breaches, threats become more complex, and regulatory requirements increase.
- Security breaches are resulting in widespread losses, not only financial, but also in time, resources and reputation:
  - According to one large security services vendor, the damage caused in just 12 days during August 2003 by the Blaster, Welchia and Sobig F. worms is estimated at $2 billion.[2]
- Despite the growing awareness, many businesses are failing to act and remain vulnerable to future threats:[3]
  - In the UK, only a third of businesses have IT security controls in place and around three quarters of UK businesses report having a security incident in the past year;
  - Processes for keeping up-to-date with the latest security patches are generally weak.
- In this focus, we review the main types of security threats and emerging themes, then the impact of these and implications for businesses.

Overview of threats

- Viruses and worms are becoming the most common and destructive threats. These, along with malicious mobile code and direct installation, propagate 'malware':
  - The average UK business receives roughly 20 viruses a year[3];
  - The risks imposed by worms has increased as a result of always-on technology and greater network integration.
- Spam (unsolicited e-mail) is increasingly being used to propagate malware, such as the Mimail C and MyDoom worms:
  - According to IDC[4], in North America the number of spam messages sent daily could soon equal the number of person-to-person e-mails (around 13 billion a day), and spam now accounts for up to 80% of all e-mail sent to businesses.[5]
- Attackers are increasingly using combinations of malware targeted at several layers of the target system. Generally, the deeper the target, the more difficult it is to detect and destroy.

Fig 6.3i Major types of online security threat[6]

Threat	Characteristic
Remote Access	Programs that allow another computer to gain information or to attack or alter your computer, usually over the Internet.
Spyware	Stand-alone programs that can secretly monitor system activity. These may detect passwords or other confidential information and transmit them to another computer.
Trojan horse	A program that neither replicates nor copies itself, but causes damage or compromises the security of the computer. Often spread by e-mail.
Virus	A program or code that infects another program, boot sector, partition sector, or document that supports macros, by inserting itself or attaching itself to that medium. Most viruses only replicate though many do a large amount of damage as well.
Worm	A program that replicates itself; for example, from one disk drive to another, or by copying itself using e-mail or another transport mechanism. The worm may do damage and compromise the security of the computer. It may arrive in the form of a joke program or software of some sort.

- In addition to these threats, there are a variety of others that are often overlooked due to their lack of publicity. These can be extremely detrimental and include internal security breaches, ex-employees, network links to supposedly trusted customers and suppliers, as well as accidental causes such as insecure wireless links set up by employees.

(1) The safeguarding of private resources and information stored in digital format
(2) Symantec Internet Security Threat Report: Trends for July 1 2003 – December 31 2003
(3) DTI Information Security Breaches Survey 2004
(4) International Data Corporation (IDC), August 2004
(5) Booz Allen statistics
(6) securityresponse.symantec.com

Focus 6ii

Threats are becoming more complex and are demanding greater resources

Emerging trends

- Attacks are becoming more automated (i.e. they can propagate without someone actively opening a file) and increasingly sophisticated:
  - There has been a rise in the number of blended threats such as Blaster, Sobig F. and Bugbear B. which exploit unpublished vulnerabilities.
- Attacks are increasingly targeted at the theft of confidential data by extracting passwords, decryption keys and logged keystrokes via spyware.(1)
- Management and deployment of security patches within businesses are consuming ever more resources. The constant stream of updates from software and hardware providers, coupled with the speed at which virus writers can exploit vulnerabilities and the prevalence of new applications is a growing challenge for IT managers.
- Many businesses lack the skills and expertise to address the increasing complexity of security threats. The majority of respondents to Deloitte's 2004 Global Security survey(2) reported difficulty in finding and hiring staff with the required skills.
- In response to this shortage, businesses are now outsourcing some non-strategic security functions, sometimes to several providers as part of a layered security strategy. However, according to the CSI/FBI 2004 survey(3), the proportion of businesses that outsource and the percentage of activities outsourced, remains low.
- Bundling of products by security providers is also becoming more common, providing businesses with best-of-breed solutions whilst reducing the number of supplier relationships that businesses need to manage.
- Managers responsible for security are increasingly being asked to justify their budget requests in purely economic terms(3) – 55% of respondents to the CSI/FBI 2004 survey reported using Return on Investment (ROI), 28% to using IRR and 25% to using NPV. This trend towards increased measurement of ICT benefits is discussed in more detail in Chapter 8.
- Adoption of industry standards by businesses has been mixed:
  - In the UK, there has been no change in awareness of, or the number of businesses that have implemented BS7799(4);
  - In the USA, the Sarbanes–Oxley Act of 2002 has raised the levels of interest in information security amongst financial services businesses but has had little impact on businesses in other sectors(3);
  - In contrast, in Australia, the proportion of businesses following standards increased significantly, from 37% in 2003 to 58% in 2004.(5)

(1) Symantec Internet Security Threat Report: Trends for July 1, 2003 – December 31 2003
(2) Deloitte Global Security Survey 2004
(3) CSI/FBI Computer Crime and Security Survey: Computer security institute
(4) DTI Information Security Breaches Survey 2004
(5) Australian Computer Crime and Security Survey 2004

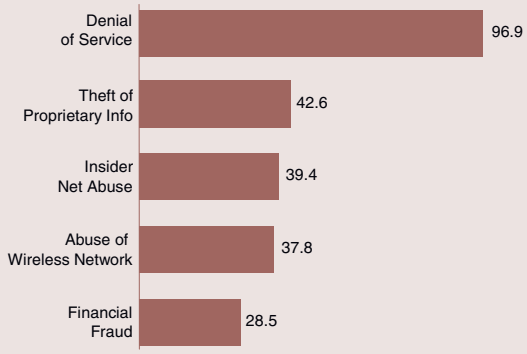
Focus 6ii

Businesses are beginning to recognise the need for better preparation for on-line security threats

Impact on businesses

- The costs of security breaches are significant:
  - In the UK the average cost of a large business' most serious security incident was roughly £120,000.(1)
- In the USA, denial of service is now the most damaging computer crime(2) followed by theft of intellectual property.
- Large businesses with significant financial resources and a prominent Internet presence are more susceptible to attack than smaller businesses.
- The frequency and severity of attacks also varies by sector; financial services, healthcare, and power and energy are typically the hardest hit.(3)
- There are signs that businesses are delaying investment on certain mobile technologies, such as wireless LANs, due to security concerns.

Fig 6.3j Average loss by type 2004 - businesses in USA ('000 US$)



Source: CSI/FBI Computer Crime and Security Survey: Computer security institute.
Note: Average of total loss reported by 269 businesses

Key implications for businesses

- Businesses need to adopt a holistic approach to information security and need to develop an effective information security awareness program:
  - Businesses must be proactive and continually monitor risk and apply the appropriate controls;
  - Security requires management in addition to technology;
  - The knowledge gap between IT departments and end users frequently compromises business security.
  - Training is vital if staff are to change their behaviours.
- In order to keep pace with the growing complexity of security threats, businesses are under growing pressure to increase expenditure on security related products and services:
  - Most businesses currently spend 3-10% of their total IT budget on security – this is expected to rise;(1,3)
  - Expenditure on vulnerability reduction (such as patch management) and identity management is also expected to rise, especially amongst large businesses.(2)

(1) Economist.com
(2) Infosecuritymag.com
(3) DTI Information Security Breaches Survey 2004

7. Process and Deployment

7. Definition

Process and Deployment refers to the extent to which ICT are effectively deployed to support key business processes

	Criteria: to score highly, a country needs businesses to	Measurement indicators (1)
Process and Deployment ▸ The extent to which ICT are effectively deployed to support key business processes: – Internal – With customers, suppliers	Provide information online for customers and suppliers	▸ Information provided online for customers by businesses (e.g. availability, pricing, after-sales, account details). ▸ *Information provided online for suppliers by businesses (e.g. products, forecasts).*
	Interact and transact externally online	▸ Facilities provided online for customers by businesses enabling ordering of and payment for goods and services. ▸ Goods and services ordered and paid for by businesses online. ▸ Barriers to online transactions.
	Deploy ICT in their internal processes	▸ Stage of integration between businesses' internal systems. ▸ Type of information businesses share internally using online technology (e.g. staff information, business changes). ▸ Uses of businesses' intranets (e.g. timesheets, business help desks) . ▸ Activities in which businesses employ online technology (e.g. invoicing, production).
	Focus 7i	▸ Businesses are becoming more selective in their use of ICT.
	Deep, pervasive integration between their internal systems and those of customers and suppliers	▸ Existence of automated integration between online ordering systems and internal systems. ▸ Type of internal systems linked to online ordering systems (e.g. stock control). ▸ Integration between internal systems and those of customers. ▸ Integration between internal systems and those of suppliers.

(1) All indicators relating to Process and Deployment are listed. Those not directly addressed within this chapter are written in italics.

Process and Deployment refers to the extent to which ICT are effectively deployed to support key business processes (cont'd)

Definition

- "Process and Deployment" refers to the ways that ICT are used by businesses, both in internal systems as well as in transacting with customers and suppliers. It refers to the following continuum of increasingly sophisticated use:
- Businesses which publish information of direct applicability to either customers or suppliers:
  - Providing relatively straightforward information such as product availability;
  - Providing sophisticated information such as order tracking.
- Businesses which interact and transact externally online:
  - Taking and placing orders and payments;
  - Providing a variety of information online;
  - Allowing progress tracking of products by customers and suppliers.
- Businesses which deploy ICT in their internal processes:
  - Sharing information internally using online technologies i.e. job vacancies, business forecasting;
  - Using the intranet for a wide variety of processes from training to collaborative working;
  - Integrating other internal systems.
- Businesses with pervasive integration between their systems and those of customers / suppliers:
  - Ordering systems linked to other internal systems;
  - Internal systems linked to online orders;
  - Systems integrated with their customers and suppliers.

Businesses are increasingly applying ICT to activities from which significant benefits can be extracted

Overall findings and key themes

E-commerce is growing, and businesses are becoming more discriminating in their application of ICT to business processes

- Survey-wide businesses are becoming more selective in the type of information that they provide, and the activities that they perform, online. Businesses are focusing more on value adding activities such as order fulfilment and payment, and cutting back on the provision of non-core information:
  - The level of transactional activities such as online ordering, payment and invoicing has increased in most countries;
  - In contrast, provision of marketing material, information about after-sales support services and tracking of order progress have been reduced.
- Large sectoral differences exist in the level of e-commerce and e-business:
  - Financial services businesses are the most likely to provide information to customers online and to allow customers to pay online;
  - Construction businesses are the least likely to.
- Online trading is increasing, particularly in Sweden and Australia:
  - The proportion of businesses that place orders online increased in Sweden and Australia by 6 percentage points.
- In the UK there is significant growth in the number of smaller businesses trading online.
- Businesses have made significant improvements in integrating their internal systems, helped in part by the increasing interoperability of systems.
- Integration with external parties has progressed more slowly. There is a slight decrease in the number of businesses that intend to integrate with their suppliers but no significant change in the levels of integration with customers.

The UK joins Sweden as a leader in the deployment of ICT

Leading nations

Sweden and the UK show the highest levels of Process and Deployment sophistication

- Swedish businesses are among the most likely provision of on-line information about customers:
  - Ranked first in terms of provision of information online about product availability; pricing, terms and conditions; delivery schedules; and after-sales service.
- Swedish businesses are also the most likely to place orders online (72% of businesses), allow customers to order online (54% of businesses) and to pay for goods online (65% of businesses).
- Businesses in the UK are the most likely to provision of on-line information about products and services, and to use online technology in after-sales support.
- The integration of ICT systems used to carry out internal processes is highest amongst businesses in Japan and the UK:
  - 73% of businesses (with internal ICT networks) in Japan and 70% in the UK have integrated internal systems or have specific plans in place;
  - Growth in the proportion of businesses with integrated internal processes is highest in Japan (up 14 percentage points) and in Sweden (up 13 percentage points).
- Businesses in Sweden, Canada and the USA are the most likely to have an ordering system that is linked to other internal systems.

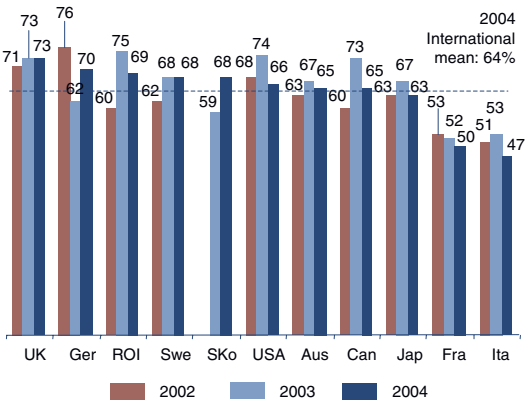
UK position

The UK has shown strong growth in many areas

- Businesses in the UK are among the most likely to publish information online for customers:
  - 73% provide information about products and services (the highest proportion of all countries surveyed);
  - 36% provide information about pricing, terms and conditions (up 5 percentage points);
  - 22% provide information about delivery schedules (up 7 percentage points).
- There has been steady growth in the proportion of businesses that place and accept orders online:
  - 59% of businesses place orders online, up 5 percentage points;
  - 37% of business accept orders online, up 5 percentage points.
- The proportion of businesses paying for goods online has increased 6 percentage points, and nearly a third of businesses now pay for goods online.

The provision of information for customers has fallen slightly in most countries

Fig 7.2a Businesses that provide information about products and services for customers online, 2002 to 2004 (%)

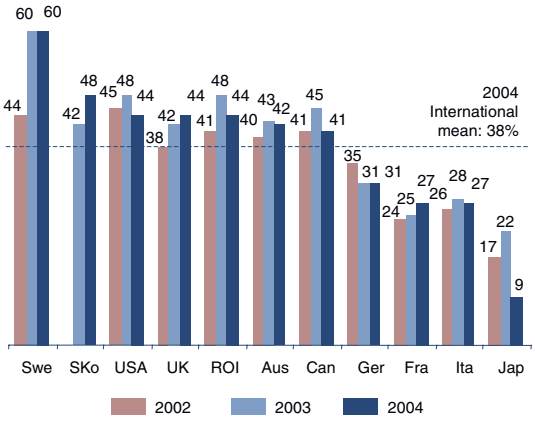


Question: "Do you provide any information about products and services to customers online?"
Base: All businesses
Note: Arithmetic average used **for 2004 mean**

Businesses in the UK, Germany and Ireland are the most likely to publish product/service information online.

- Among the leading nations, just over two-thirds of businesses provide customers with information on products and services online.
- Growth has been mixed:
  - There have significant increases in South Korea (9 percentage points) and Germany (8 percentage points);
  - However, there have been significant decreases in the USA, Canada, Ireland and Italy.
- The UK is now the leading nation, with 73% of businesses providing product/service information online.
- There is significant variation by sector:
  - Survey-wide, around 82% of financial services businesses provide product/service information online for customers compared with only 47% of construction businesses.

Fig 7.2b Businesses that provide information about product availability for customers online, 2002 to 2004 (%)



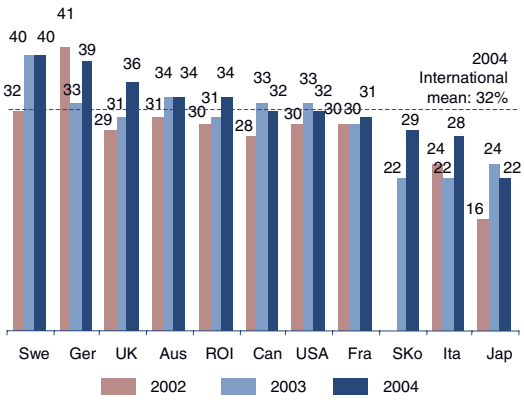
Question: "Do you provide any information about product availability to customers online?"
Base: All businesses

Product availability information for customers is less widely available, with Sweden still the clear leader

- 60% of businesses in Sweden provide information about product availability online for customers, 22 percentage points above the average.
- Businesses in Germany, France, Italy and Japan are the least likely to provide product availability information online.
- There has been a significant decline in Japan; the number of businesses providing product availability information online has more than halved since 2003. This is surprising, especially given that there has been little change in the proportion of businesses providing product or service information.
- Financial services businesses are again the most likely to provide product availability information online and construction businesses the least likely.

More businesses are providing information online about pricing, terms and conditions and delivery schedules

Fig 7.2c Businesses that provide information about pricing, terms and conditions for customers online, 2002 to 2004 (%)

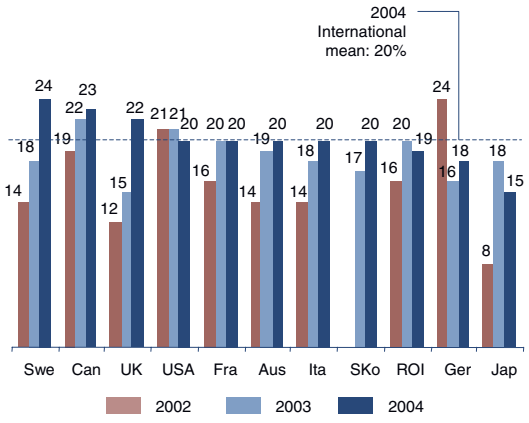


Question: "Do you provide any information about pricing, terms and conditions to customers online?"
Base: All businesses

Around a third of all businesses provide information about pricing, terms and conditions online

- The proportion of businesses providing information about pricing, terms and conditions online has increased slightly in several countries, including South Korea (up 7 percentage points), Germany and Italy (both up 6 percentage points)
- The UK also saw slight growth, with 36% of businesses providing this information, up 5 percentage points on 2003.
- There has been no change in the proportion of Swedish businesses providing this information and Sweden remains at the top of the table, followed closely by Germany.

Fig 7.2d Businesses that provide information about delivery schedules for customers online, 2002 to 2004 (%)



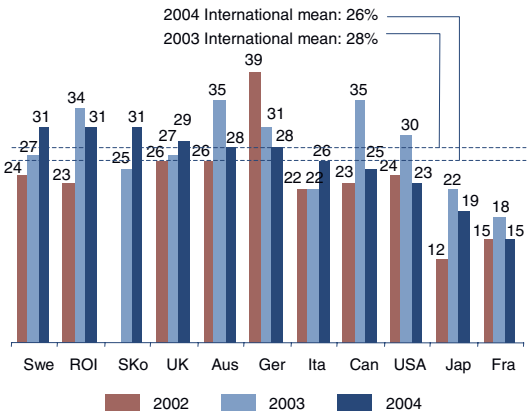
Question: "Do you provide any information about delivery schedules to customers online?"
Base: All businesses

15-25% of businesses provide delivery schedule information online

- Information about delivery schedules is provided by few businesses – unsurprisingly as physical delivery is relevant only to some sectors (e.g. manufacturing) and represents a more sophisticated use of technology.
- There is little difference in the proportion of businesses that provide delivery schedule information among the majority of countries surveyed.
- There have been significant increases in the UK (up 7 percentage points) and Sweden (up 6 percentage points).
- Businesses in Germany and Japan are the least likely to provide delivery schedule information for customers online.
- As expected there are significant differences between sectors; nearly a third of transport and communications businesses provide delivery schedules online compared with only around one-in-eight construction businesses.

Fewer businesses are providing after sales information online, but more are providing information about customers' account details

Fig 7.2e Businesses that provide information about after sales service for customers online, 2002 to 2004 (%)

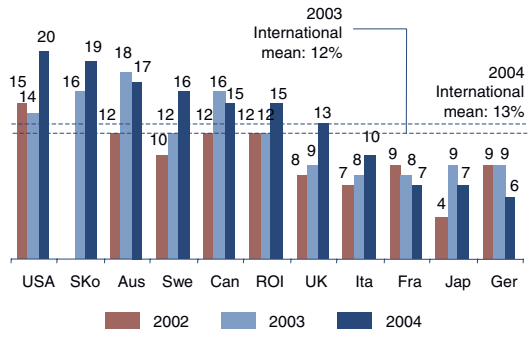


Question: "Do you provide any information about after sales service?"
Base: All businesses

The proportion of businesses providing information online about after sales services for customers has fallen in several countries

- Survey-wide, the average proportion of businesses providing information about after-sales services online has fallen from 28% to 26%:
  - With the exception of the UK, the most significant drops were in the English-speaking countries;
  - The largest decline was in Canada, which fell 10 percentage points.
- The greatest growth was in South Korea, which increased by 6 percentage points.
- There was little change in the UK, with 29% of businesses now providing this information.
- Japan and France remain at the bottom of the table.

Fig 7.2f Businesses that provide information about customers' account details online, 2002 to 2004 (%)



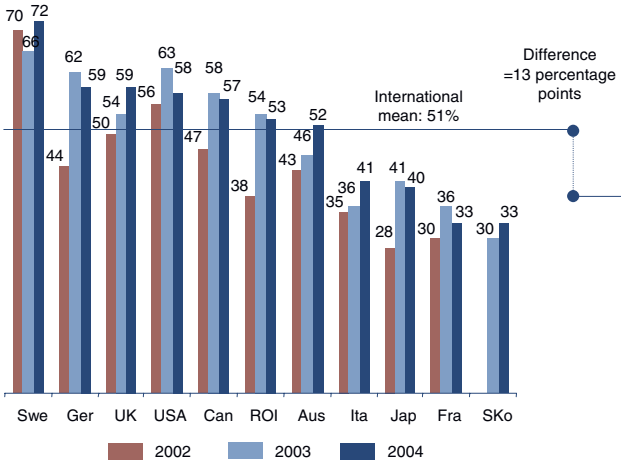
Question: "Do you provide any information about customers' account details online?"
Base: All businesses

There has been a slight increase in the number of businesses providing customer account details online

- In general, growth was highest among countries that are already above average. The USA increased 6 percentage points and Sweden 4 percentage points.
- The proportion of businesses providing customer account details declined slightly in France, Japan and Germany.
- The increasing polarisation between leading and trailing countries may reflect the difference in attitudes towards online banking and account management.

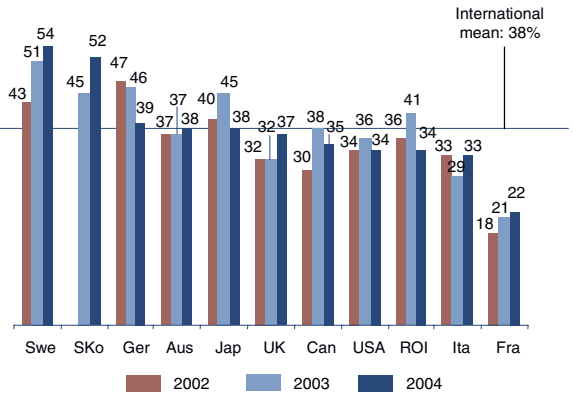
The proportion of businesses ordering online has stabilised in most countries

Fig 7.3a Businesses that place orders online, 2002 to 2004 (%)



Question: "Does your business order online?"
Base: All businesses

Fig 7.3b Businesses that allow customers to order online, 2002 to 2004 (%)



Question: "Can your customers order online?"
Base: All businesses

More businesses place orders online than accept them. Growth has slowed.

- The strong growth in e-commerce evident in last year's survey has slowed considerably and in five of the eleven countries surveyed (Germany, USA, Canada, Ireland and Japan) there has been a slight decline in the number of businesses reporting use of e-commerce:
  - The most significant decline in the proportion of businesses that place orders online is in the USA, which has seen a fall of 5 percentage points;
  - In terms of the number of businesses that allow customers to order online, the most significant declines were in Germany, Ireland and Japan which all dropped 7 percentage points.
- Use of e-commerce is still highest in Sweden, where there has been growth in both the proportion of businesses that place orders online (up 6 percentage points) and the proportion that allow customers to order online (up 3 percentage points).
- Within the UK there has also been steady growth:
  - 59% of businesses now place orders online, up 5 percentage points;
  - 37% of businesses accept orders online, up 5 percentage points.
- The disparity between the proportion of businesses that place orders online and those that accept them is similar to 2003 (around 13 percentage points):
  - This suggests that overall buyers are still benefiting from e-commerce more than suppliers (a theme explored in detail in last year's IBS report) and that cost savings are a greater driver of e-commerce than revenue generation;
  - South Korea is the only country where more businesses allow customers to order (52%) online than place orders online (33%).
  - The magnitude of the disparity in similar to that estimated in the European e-Business Report(1) which reports the average disparity in 2003 in 5 European countries to be around 15 percentage points.

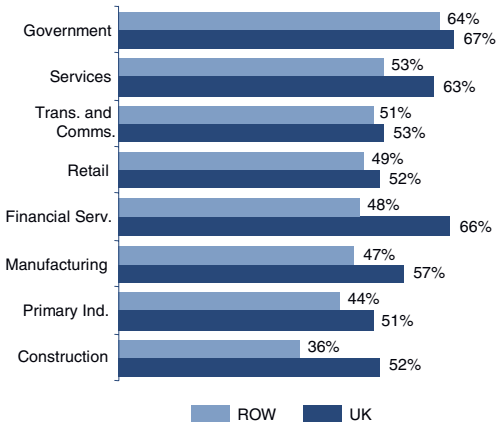
Key barriers

- Of the businesses that currently do not let customers order online 38% reported that it was because the product is unsuitable, and 17% that they do not have the technology in place.
- On average, around one in ten businesses not accepting orders online stated that their customers prefer other sales channels, such as face-to-face meetings.

(1) The European Commission 2003 European e-Business Report

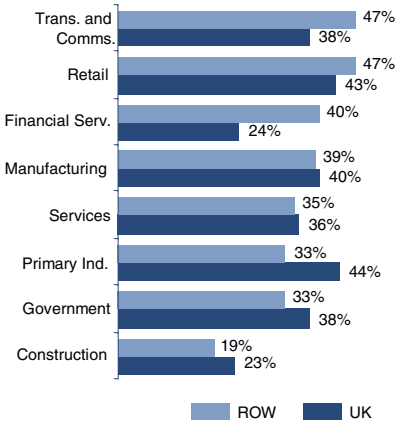
There is significant variation by sector, particularly in the proportion of businesses that allow customers to place orders online.

Fig 7.3c Businesses that place orders online, by sector 2004 (%)



Question: "Does your business order online?"
Base: All businesses

Fig 7.3d Businesses that allow customers to place orders online, by sector 2004 (%)



Question: "Can your customers order online?"
Base: All businesses

Survey-wide government organisations are the most likely to place orders online

- Around two thirds of government organisations place orders online.
- Businesses in the construction sector and primary industries are among the least likely to place orders online.
- Variations across sectors are different within the UK from those of other countries:
  - The UK sector averages for financial services and construction businesses are 18 and 16 percentage points respectively above the sector average for other countries.

There is significant variation across sectors in the proportion of businesses that allow customers to place orders online

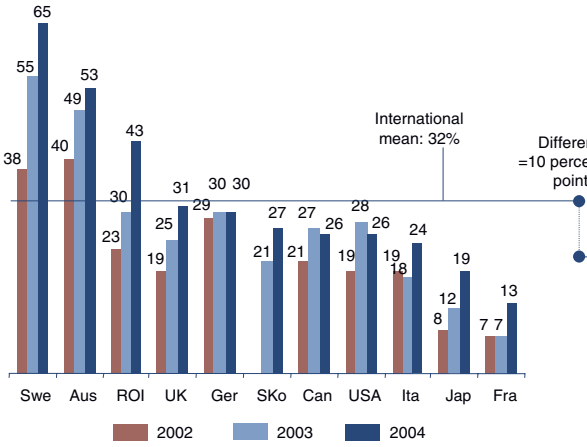
- Outside of the UK, customer-facing businesses such as those in the retail and transport and communications sectors are the most likely to allow customers to place orders online:
  - Surprisingly, in the UK, businesses in primary industries are the most likely to allow customers to place orders online.
- Only a quarter of financial services businesses in the UK allow customers to place orders online, significantly below the sector average for other countries:
  - This is slightly surprising given that UK financial services businesses are among the most likely to place orders online (Fig 7.3c);
  - However, this may be the result of the requirement for paper based ID for many banking activities, such as establishing an account, which prevents more online transactions.

Discussion of drivers

- The difference in the variation across sectors between the average proportion of businesses that place orders online versus those that accept orders online can largely be attributed to the differences in characteristics of the product/services provided; for example, travel tickets are more suited to being bought online than construction services.
  - Travel tickets are increasingly being treated like a commodity by consumers and sales of them don't require a trusted relationship because of the well established regulatory infrastructure.
- In sectors where there is a high concentration of suppliers relative to purchasers (such of manufacturing) and buyer power is high, purchasers can, and often have, influenced the level of online trading of suppliers.
  - An example of this can be seen in Sweden where Volvo has encouraged many of its suppliers, both large and small, to trade online.

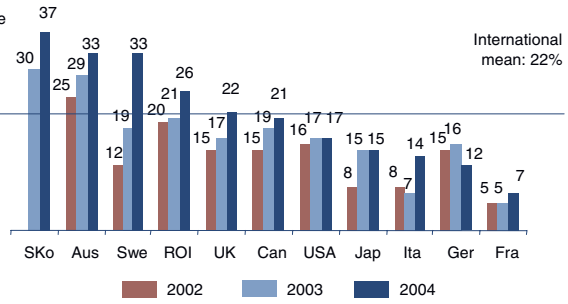
Online payment has increased in most countries

Fig 7.3e Businesses that pay for goods and services online, 2002 to 2004 (%)



Question: "Does your business make payments online?"
Base: All businesses

Fig 7.3f Businesses that allow customers to pay for goods and services online, 2002 to 2004 (%)



Question: "Can your customers make payments online?"
Base: All businesses

More businesses pay for goods and services online than allow their customers to pay for goods and services online

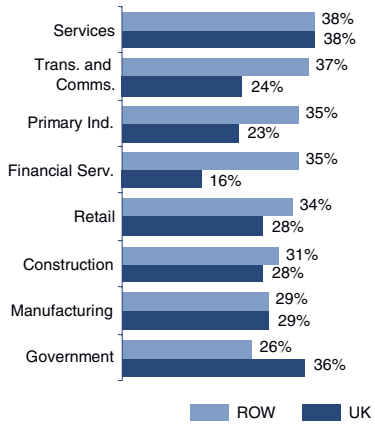
- Survey-wide, 32% of businesses pay for good and services online, versus 22% of businesses which allow their customers to pay for goods and services online.
- In terms of businesses paying for goods and services online, Sweden, Australia, Ireland and South Korea have extended their lead over other countries.
  - 65% of businesses in Sweden (up 10 percentage points), 53% of businesses in Australia (up 4 percentage points) and 43% of businesses in Ireland (up 13 percentage points) pay for goods online.
- In the UK, the proportion of businesses paying for goods online has increased 6 percentage points, with nearly a third of businesses paying for goods online. The proportion of UK businesses that allow customers to make payments online has also increased by 5 percentage points to 22%.
- Businesses in Japan and France are still the least likely to pay for goods online, despite strong growth since 2003.

Key barriers

- In the UK, the most commonly cited reasons for not allowing customers to pay online were as follows:
  - "Unsuitable product" (cited by 26% of businesses not currently allowing customers to pay online);
  - "Do not have the technology in place" (25%);
  - "Not the policy / set process" (25%).
- 5% cited security and fraud as a reason.

Differences between sectors are relatively small

Fig 7.3g Businesses that pay for goods and services online, by sector 2004 (%)

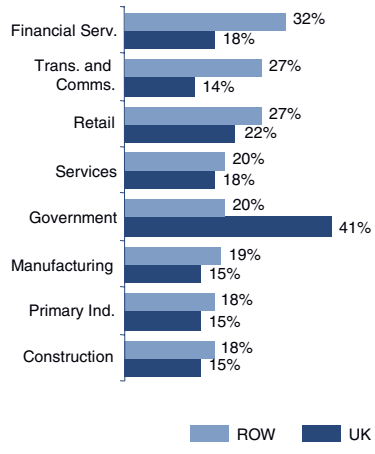


Question: "Does your business make payments online?"
Base: All businesses

Sector variations in the number of businesses that pay for goods and services online are less pronounced than for online ordering

- Services businesses are the most likely to pay for goods and services online, marginally ahead of businesses in the transport and communications sector, primary industries and financial services sector.
- In the UK, Financial Services businesses are the least likely to pay for goods and service online.

Fig 7.3h Businesses that allow customers to pay for goods and services online, by sector 2004 (%)



Question: "Can your customers make payments online?"
Base: All businesses

Survey-wide financial services businesses are the most likely to allow customers to pay online

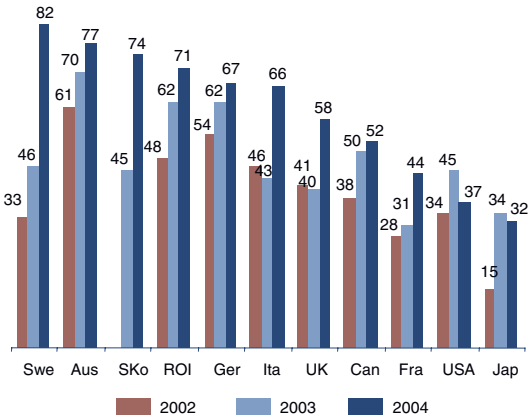
- On average, twice as many government organisations in the UK allow customers to pay for goods and services online as those in the other countries.
- Government organisations and financial services businesses in the UK are more likely to allow customers to pay online than pay online themselves.
- In contrast, services businesses are much more likely to pay for goods online than to allow customers to do so.

Discussion of drivers

- Many businesses that order online are now realising the additional cost savings that come through online payment and settlement. As a result there has been an increase in the proportion of businesses that allow customers to pay online.
- There is greater variation in the proportion of businesses that allow customers to pay for goods and services online compared with the proportion that pay for goods and services. In sectors where the majority of customers are other businesses (such as wholesale), businesses may be more inclined to allow payment online than in sectors where the majority of customers are consumers.

Online usage of other payment related technologies have also increased

Fig 7.3i Businesses that use online banking 2002 to 2004 (%)

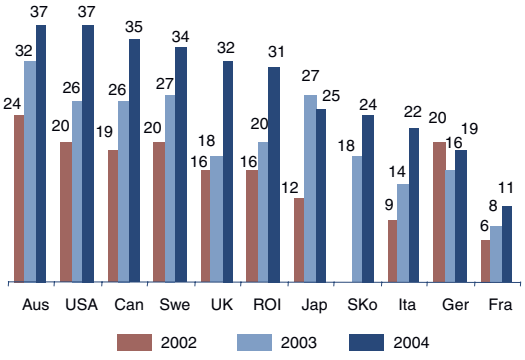


Question: "Does your business use online banking?"
Base: All businesses with an online technology

The proportion of businesses using online banking has risen rapidly in most countries

- Growth in the number of businesses using online banking has been highest in Sweden
  - 82% of businesses with an online technology now report using online banking, up 36 percentage points from last year.
- The USA (down 8 percentage points) is the only country where there has been a significant drop;
  - This is surprising given the strong growth of online banking in the USA amongst consumers.(1)

Fig 7.3j Businesses that use online technology for invoicing 2002 to 2004 (%)



Question: "Does your business use online technology for invoicing?"
Base: All businesses with an online technology

There has also been strong growth in the proportion of businesses using online technology for invoicing

- In general, adoption is highest amongst English-speaking countries;
  - Australia and the USA lead, with 37% of businesses with an online technology invoicing online;
  - Usage in the UK by businesses with an online technology has almost doubled, with 32% now using online invoicing, up from 18% in 2003.
- There is still a large disparity between adoption levels across the countries surveyed.
  - Adoption is lowest in France, where the proportion of businesses that use online invoicing is less than a third that in the leading nations.

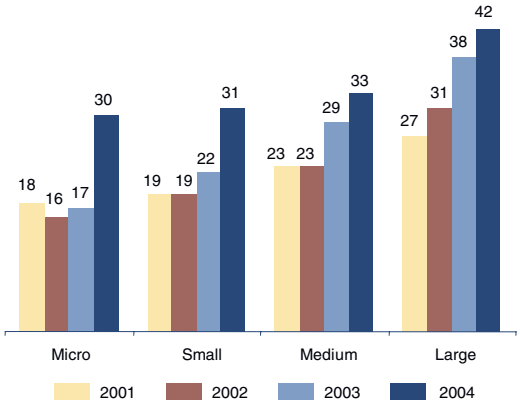
Discussion of drivers

- Research has shown that trust in online banking services is associated with the prolonged use the Internet(2). The longer businesses have been using the Internet the greater their propensity to use online-banking. Since there are still many businesses that have only relatively recently started to use the internet, we would expect the levels of online banking to continue to rise over the next few years.

(1) comScore Networks Online Banking Report, June 2004
(2) Nua (www.nua.ie), March 2003

More micro and small businesses in the UK are using e-commerce

Fig 7.3k Trading online by business size (UK)(1)



Source: 2004 Survey analysis of combined questions
Base: All businesses

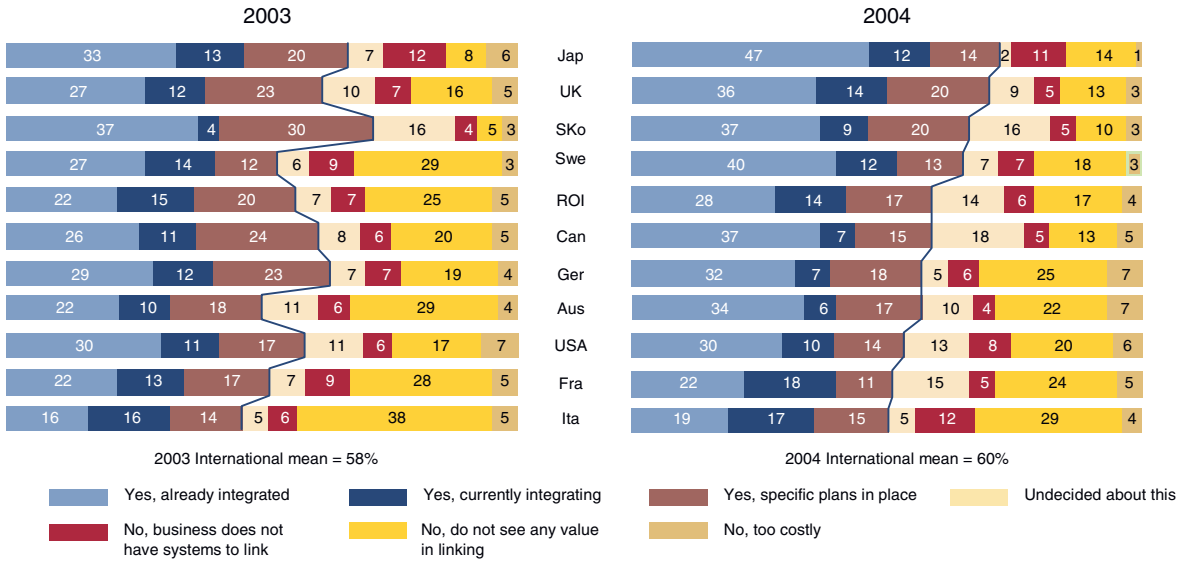
This year, smaller businesses in the UK have made dramatic progress in trading online

- In the UK, larger businesses are still the most likely to trade online.
- However, the gap between larger and smaller businesses is closing;
  - Adoption levels amongst large and medium businesses have increased 4 percentage points;
  - Adoption amongst micro and small business has increased by an average of 11 percentage points.

Note(1): To be counted as trading online a business must fulfil the following function:
Online trading = f[(enabling customers to order online) AND (enabling customers to pay online OR pay for own goods/services online) OR (order own goods/services online) AND (enabling customers to pay online OR pay for own goods/services online)]

Deployment of ICT in internal processes has increased

Fig 7.4b Businesses with integrated internal systems (%)



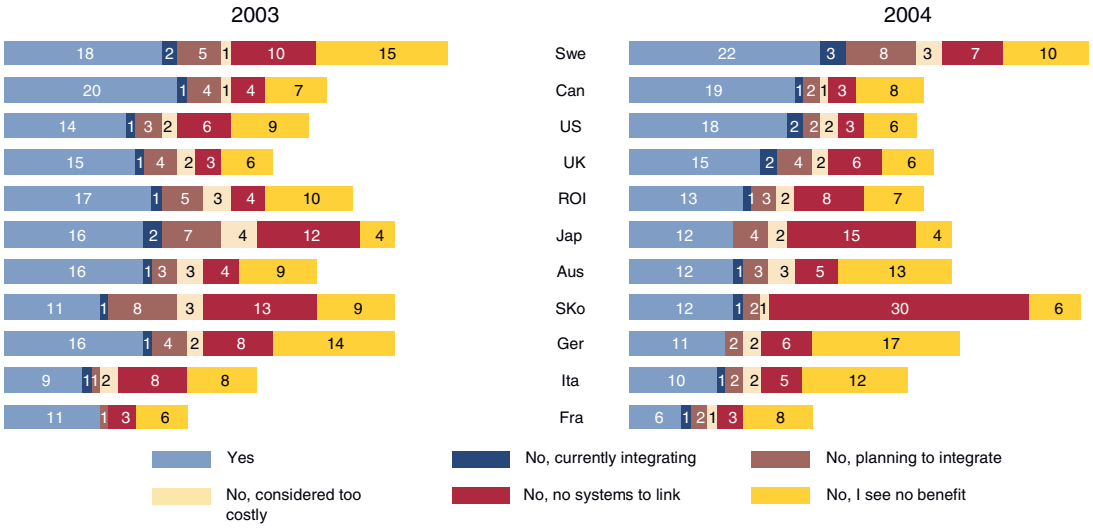
Question: "Do you intend to integrate your internal systems so that they are linked and can share information?"
Base: All businesses with LAN, WAN or Intranet

Businesses in Japan, the UK, South Korea and Sweden have the most integrated internal systems

- Integrating internal systems enables businesses to:
  - Automate the linkage between formerly discrete systems such as sales forecasting and production scheduling;
  - Share information among employees, e.g. via an intranet.
- Businesses in Japan and Sweden have the highest proportion of businesses that claim to have already integrated their internal systems.
- There has been a significant increase in the proportion of businesses with internal systems that claim to have already integrated these systems:
  - The greatest increases are in Japan (up 14 percentage points), Sweden (up 13 percentage points), Australia (up 12 percentage points), Canada (up 11 percentage points) and the UK (up 9 percentage points).
- This increase reflects the trend that, in contrast to last year, businesses are now increasingly seeing value from integrating their systems.
  - Part of the reason for this is that many systems have become easier to integrate as a result of more modular designs and a general consolidation by businesses in the number of systems that are employed.

There is limited growth in the linking of ordering systems and businesses' internal systems

Fig 7.4c Businesses with an ordering system linked to other internal systems (%)



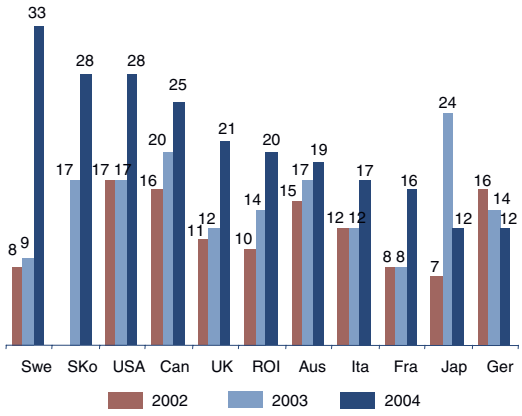
Question: "When you receive an order online, are other internal systems automatically updated with that information (e.g. warehouse stock control, financial records) using technologies such as EDI, XML and Auto Id?"
Base: All businesses

Businesses in Sweden, Canada and the USA are most likely to have an ordering system that is linked to other internal systems

- Swedish, Canadian and American businesses reported the highest levels of linkage between ordering and other internal systems:
  - 33% of Swedish businesses and 22% of Canadian and American businesses have ordering systems linked to other internal systems (or are currently or planning to integrate);
- Sweden, the USA, Italy and the UK are the only countries where the proportion of businesses reporting use of and the proportion planning or currently integrating an ordering system linked to other internal systems has increased since last year.
- The proportion of businesses with an ordering systems that is linked to other internal systems is lowest in France, Italy and Germany.

Use of ICT in production-related areas is growing rapidly

Fig 7.4d Businesses that use ICT technology in production, 2002 to 2004 (%)



Question: "Does your business use online technology as part of the process for [production]?"
Base: All businesses with an online technology

Use of ICT in areas related to production are now rising rapidly

- Examples of uses of ICT in production include resource planning systems such as SAP or JD Edwards.
- Sweden has seen a dramatic increase, rising 24 percentage points.
- There are also significant increases in 7 other countries.
- Last year's leader, Japan, is the only country to show a significant decline (down 12 percentage points).

Businesses are becoming more selective in the types of ICT they deploy

Key findings

- Businesses are becoming more selective in the type of information that they provide and the activities that they perform online;
  - The level of transactional activities such as online ordering, payment and invoicing has in general increased across all businesses and regions.
  - In contrast, provision of marketing material, information about after-sales support services and tracking of order progress have been reduced.

Fig 7.4e Summary of ICT adoption trends

Adoption Trend	Online Activity	Int. Change(1)	UK Change(2)	Leaders
Up	Banking	12	18	Swe
	Invoicing	7	14	Aus
	Use of online tech. in production	6	9	Swe
	Payment of goods and service	5	6	Swe, Aus
	Collaborative design with customers and suppliers	5	13	Swe
	Stock taking	5	10	Sko
	Placement of orders	1	5	Swe, UK, Ger
Mixed	Identification of suppliers	0.3	9	UK, ROI, Aus
	Checking availability of supplies	(0.1)	7	UK, Swe
	Automated re-ordering	(1.2)	2	Aus, Ita, Fra
	Gathering of product and service information	1	8	Swe, UK
	Tendering new business	2	7	Ita, Swe
	Research and Development	2	3	Can, US
	After sales services	2	4	Swe
	Recruitment	0	2	Sko
Down	Ordering via marketplace or exchange	(2)	2	Swe, UK
	Tracking of order progress	(2)	1	UK, ROI
	After sales support services	(2)	2	UK, Swe, ROI
	Marketing	(5)	1	UK

(1) Change in survey-wide average 2003 to 2004, percentage points
(2) Change in UK average 2003 to 2004, percentage points

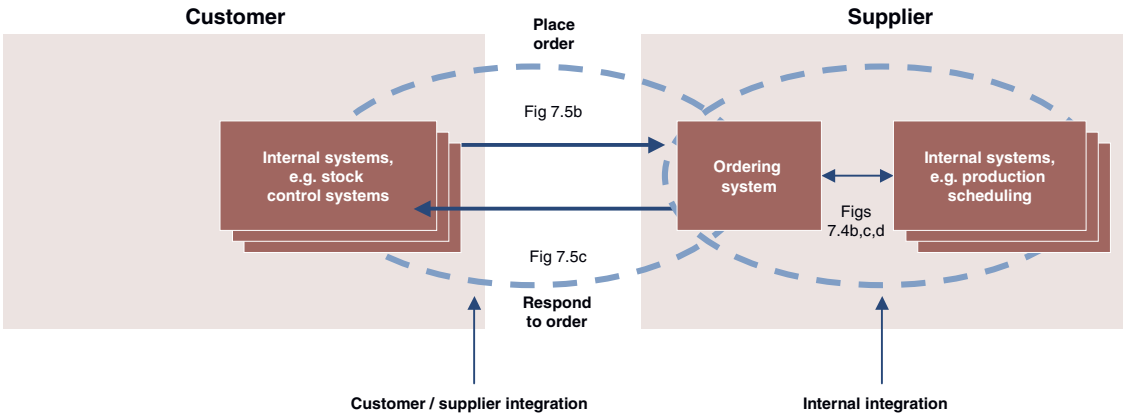
Discussion

- During the ICT boom many businesses deployed ICT across processes and functions with great enthusiasm, though not always with great understanding.
- With the newly emerging focus on benefits and value, businesses are refining their ICT portfolio to focus on ICT investments which provide not just benefits, but *measurable* benefits.
- Application of ICT to high volume, routine processes such as invoicing can deliver the measurable benefits businesses are seeking and it is in these types of activities that we see increases over last year.
- Conversely, when ICT is applied to content-orientated activities such as marketing or other information provision, the benefits are more difficult to measure. As is expected, application of ICT to these activities appears to have slowed, or even declined.
- The trend towards increasing ICT selectivity is also noted in the EITO report(1) which notes: “The short-term objective for companies is to align their business goals with an Internet enabled strategy by selectively earmarking Web Investment. Demand will therefore become increasingly selective, depending on the issues the Web will be asked to face.”

(1) The European Information Technology Observatory 2004 (EITO)

ICT integration between customer and suppliers is arguably the most sophisticated deployment of all

Fig7.5a Systems integration internally and externally between customers and suppliers

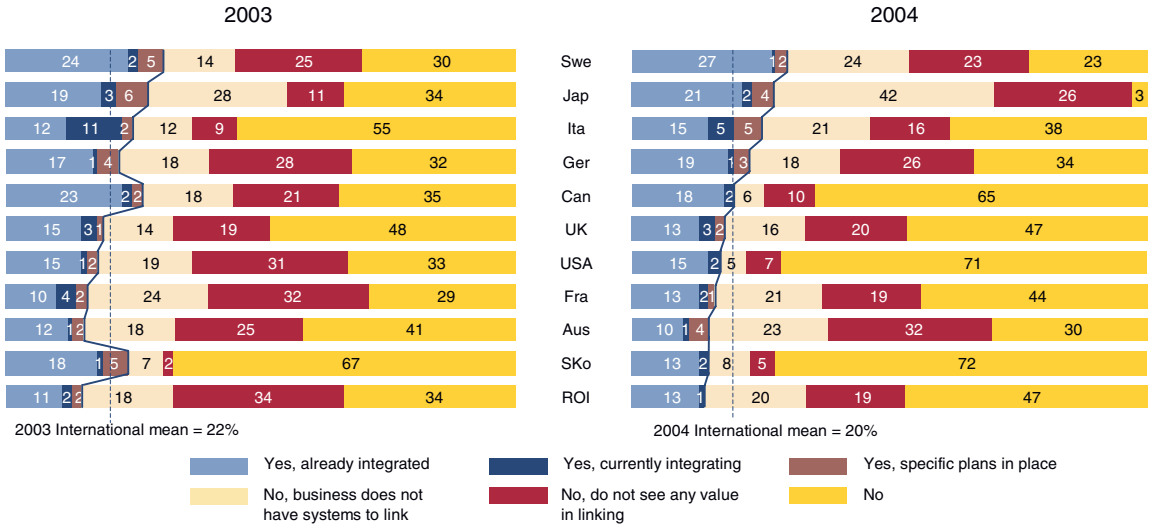


- Businesses, as customers or suppliers, may integrate their systems with those of external parties at two levels of sophistication:
  - Either via a simple access arrangement (e.g. a customer having access to their supplier's real time inventory status prior to ordering);
  - Or via an automated process of reordering based on stock levels or product schedules.
- Typical examples would be the linking of a customer's stock control system to the order receipt system of the supplier. For example, a car manufacturer procures car doors from supplier A who in turn buys sheet steel from supplier B. The car manufacturer's production planning systems maybe linked directly to the sales and demand tracking systems of supplier A, triggering production, hence delivery. These demands may also trigger the delivery of sheet steel from supplier B. The increased sharing of information is potentially beneficial to all parties, helping to reduce inventory and increase production efficiency through more timely deliveries and fewer stock-outs.
- Over the next couple of pages we examine levels of these kind of integrations; in some senses, the most sophisticated uses of ICT.

Relatively few businesses that interact online have integrated their systems, or plan to integrate their systems, with those of their suppliers

Less than a third of businesses who interact with suppliers online have or are planning to integrate their systems with those of their suppliers.

Fig 7.5b Businesses with systems integrated with suppliers (%)



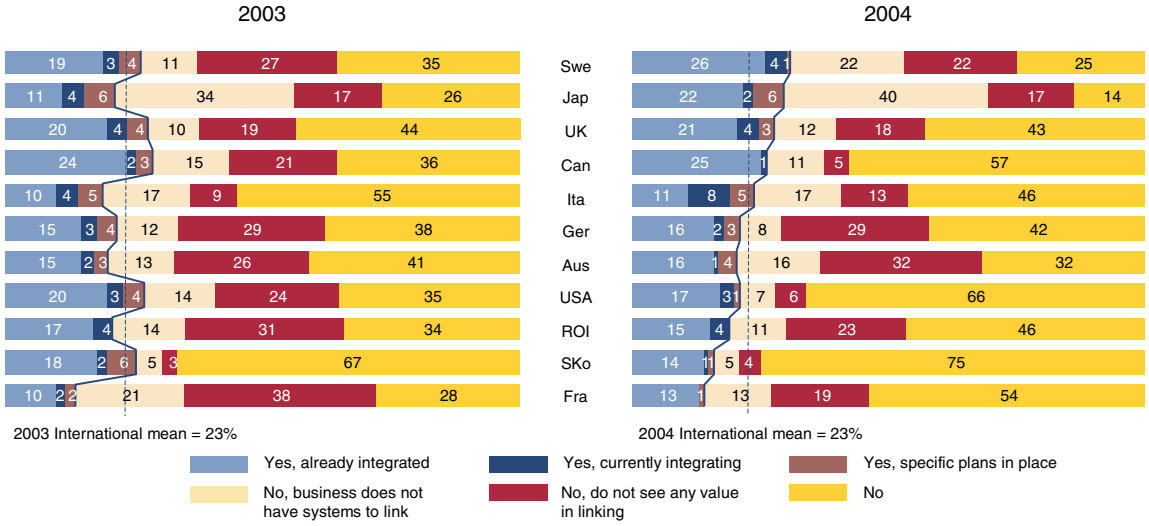
Question: "Are any of your systems integrated with those of your suppliers?"
Base: All businesses that interact online with suppliers (e.g. order/pay for supplies, track orders)

- Figures here refer to all businesses who interact with suppliers online, for example to check availability of supplies, order/pay for supplies, use e-market places, track order progress or use after sales support online.
- There has been little change in the proportion of businesses interacting with suppliers online that have integrated their systems:
  - Sweden and Japan still have the highest proportion of businesses who interact or who are planning to interact online with supplier integrated systems.
- However, there has been an increase in the number of businesses that see value in integrating with suppliers, especially among the lower ranking countries:
  - In the USA, the number of businesses reporting that they saw no value from integration fell 24 percentage points, similarly Ireland saw a fall of 15 percentage points and France 13 percentage points.
- Despite the increase in the number of businesses that perceive value in integrating, the proportion of businesses planning to integrate has not changed.
- The UK remains in the middle of the group:
  - 16% of businesses have already integrated or are in the process of doing so; and
  - Only 2% of businesses have specific plans to integrate.

Similarly, relatively few businesses who interact online have integrated their systems with those of their customers

Overall, the proportion of businesses that interact online that have or plan to integrate with their customers remains largely unchanged, with increases in several countries and declines in others.

Fig 7.5c Businesses with systems integrated with customers (%)



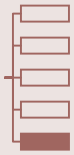
Question: "Are any of your systems integrated with those of your customers?"
Base: All businesses that allow customers to interact online with them (e.g. order, pay for goods, track progress etc)

- The greatest increase in the level of integration was in Japan where the proportion of businesses that reported to have already integrated their systems doubled.
- There have been significant declines in South Korea (down 10 percentage points) and the USA (down 6 percentage points) in the proportion of businesses that have integrated, or that are planning to integrate, with the systems of their customers.
- There has also been a slight drop across all countries in the number of businesses, that interact online, that are currently in the process of integrating or that have specific plans in place. This suggests that the level of integration with customers is starting to plateau.

8. Perceived Impact

8. Definition

Perceived Impact refers to the extent to which the adoption of ICT fundamentally changes the way businesses do business

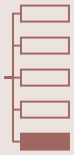


	Criteria: to score highly, a country needs	Measurement indicators
Perceived Impact ▸ Degree of real transformation in the way businesses do business ▸ Perceived positive impacts of introducing ICT	A high proportion of businesses' transactions being made online	▸ Proportion of value of sales ordered using online technologies. ▸ Proportion of value of a businesses' orders made using online technologies.
	Businesses which have seen the benefits of using ICT	▸ Frequency of the measurement of costs of technology. ▸ Frequency of the measurement of the benefits of technology. ▸ Achievement of objectives of online technology adoption (e.g. increase turnover, reduce costs). ▸ Other benefits gained from implementing online technologies. ▸ Benefits seen following connection upgrade.

Definition

- "Perceived Impact" refers to the extent to which the adoption of ICT fundamentally changes the way businesses do business.
- It encompasses both real transformation and the perceived impact of introducing ICT.
- Countries whose businesses have realised high impact exhibit:
  - A high proportion of sales being made online;
  - Benefits from using ICT, such as improved communications, or simplified processes.

Businesses are realising a wide range of benefits ranging from improved efficiency to improved communications with staff, suppliers and customers



Overall findings and key themes

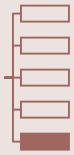
Online sales are up and businesses are realising a wide range of benefits

- For businesses that allow ordering online, average online sales as a percentage of total sales grew in eight out of the eleven countries surveyed, in contrast to the overall decline noted in last year's IBS report.
- The average percentage of total procurement made online by businesses placing orders online has increased significantly in several countries, although overall growth appears to have slowed.
- There has been a significant increase in the number of businesses with technology that are measuring the benefits of ICT but no significant change in the number of businesses with technology measuring cost.
- Businesses are taking a holistic approach to ICT adoption and are considering a broad range of factors – reduced cost is no-longer the prime driver:
  - The most commonly cited benefit of ICT adoption and deployment is increased efficiency;
  - Other major drivers include improved communications with customers, suppliers and staff and faster access to information.

Leading nations

Overall, businesses in Sweden and the USA perceive the greatest impact from the implementation of ICT

- Swedish businesses remain the most likely to measure the costs of technology.
- The proportion of businesses measuring the benefits of technology is highest in the USA and they are also among the most likely to measure costs:
  - The UK showed the highest increase in the proportion of businesses measuring the benefits of technology.
- Of businesses which procure online, those in South Korea are amongst the leaders in terms of the average proportion of total orders (by value) placed online.
- South Korea is also a leader in terms of the proportion of businesses with a technology which have realised benefits from ICT implementation.



UK businesses are increasingly feeling the impacts of technology

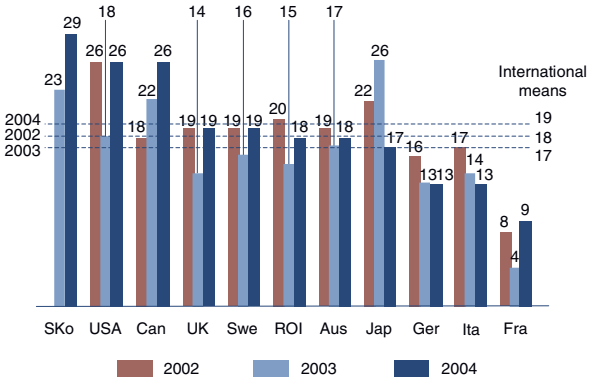
UK position

Online sales and procurement have increased significantly among UK businesses and more of them are now measuring the benefits of technology

- On average, UK businesses receiving online orders make 19% of the total value of their sales from online sales, up 5 percentage points from 2003:
  - The proportion of online sales is highest among transport and communications businesses.
- The average proportion of goods and services procured online (by value) by businesses that order online rose by 8 percentage points to 24%, the largest increase in any of the countries surveyed.
- The primary reasons businesses cite for implementing new technology are to increase efficiency and improve communications with customers. Only 12% of all businesses cited cost as the main driver.
- The proportion of businesses realising *additional* benefits (over and above those originally planned for) from ICT implementations has fallen, in part because businesses have become more adept at predicting benefits:
  - The proportion of businesses with a technology realising additional benefits has fallen by 15 percentage points;
  - The proportion of businesses with a technology that measure benefits of that technology has increased by 15 percentage points.

Online sales and procurement channels are well established in most countries

Fig 8.2a Average percentage of total sales (by value) made online by businesses selling online, 2002 to 2004 (%)

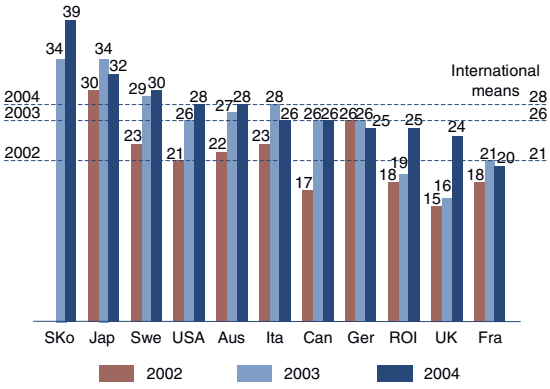


Question: "Percentage of the value of sales are ordered using online technologies?"
Base: All businesses which enable customers to order online

On average, the value of online sales as a proportion of total sales has broadly stabilised or improved across the survey, in contrast to the decline in 2003

- On average, online sales represent a significant proportion of sales in businesses that allow customers to order online:
  - In the leading countries, average online sales account for over a quarter of total sales (by value) of businesses selling online.
- The average levels of online sales as a proportion of total sales have recovered from the drop last year in many countries and appear to be reaching a steady state. This is to be expected, as noted in IBS 2003: as use of ICT in business matures, the online sales channel should mature and become an established channel alongside retail, telephone, etc.
- Canada, Italy and Japan are the main exceptions to this trend:
  - Among businesses selling online, the average proportion of total sales (by value) that was made online has grown steadily in Canada and declined in Italy and Japan.
- In the UK, businesses selling online make 19% of the total value of their sales through online orders.

Fig 8.2b Average percentage of total purchases (by value) made online by businesses which place orders online, 2002 to 2004 (%)



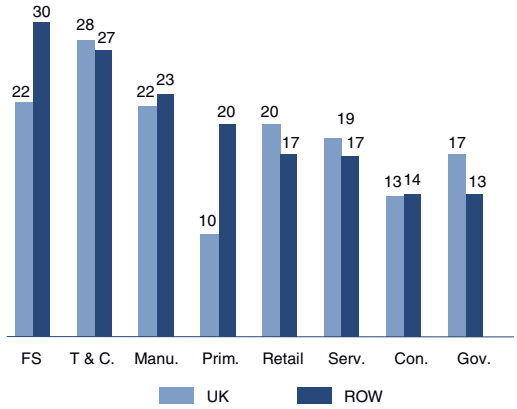
Question: "Percentage of the value of goods and services ordered by your business made using online technologies?"
Base: All businesses which order online

Among businesses that order online, the average proportion of goods and services purchased online has increased significantly in several countries, although overall growth appears to have slowed

- Among businesses procuring online, the average proportion of the total value of their purchases that is spent online has continued to grow.
- Growth is highest in the UK (up 8 percentage points), Ireland (up 6 percentage points) and South Korea (up 5 percentage points).
- As the percentage of goods and services procured online grows, businesses will seek to increase the level of process automation in order to capture further cost savings. The proportion of businesses that have or plan to integrate with suppliers (Fig 7.5b) is likely to increase over the next few years.

Variations between sectors can largely be attributed to differences in product characteristics and the supply chain

Fig 8.2c Average percentage of total sales (by value) made online by businesses selling online, by sector (%)

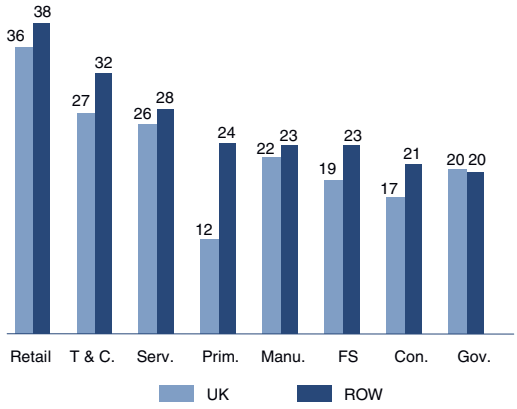


Question: "What percentage of the value of sales are ordered using online technologies?"
Base: All businesses which enable customers to order online.

The average proportion of the value of total sales that is made online by businesses selling online is highest among financial services(1) and transport and communications businesses

- The average percentage of total sales that is made online by businesses selling online is highest in the financial services and transport and communications sector. This reflects the ease with which financial products can be traded online and the strong growth in online banking (see Fig 7.3i).
- Online sales are also high among transport and communications businesses. This may be driven by the high volume of the transport tickets sold online.
- In the UK, the proportion of financial services businesses that sell online (Fig 7.3d) and the average value of online sales among those that do are significantly below the average across other countries. This may be because a large proportion of transactions are conducted over private networks rather than the Internet.

Fig 8.2d Average percentage of total purchases (by value) that are made online by businesses which place online orders, by sector (%)



Question: "What percentage of the value of goods and services ordered by your business made using online technologies?"
Base: All businesses which order online.

The average percentage of total purchases by businesses which place orders online is highest in retail businesses

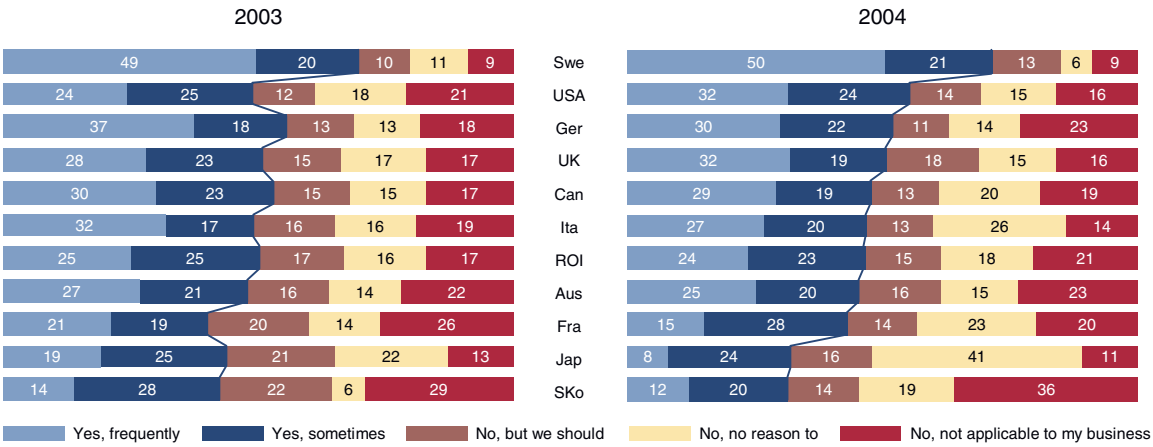
- On average, retail businesses that order online procure 38% (by value) of supplies online – a significantly higher proportion than businesses in other sectors:
  - Orders placed by retail businesses are typically well-suited to online procurement: high volume, many standard products and a high percentage of repeat orders.
- In contrast, construction businesses and government organisations that order online procure on average 20% of goods and services (by value) online:
  - Many of the goods and services are complex, one-off items;
  - Goods and services are sourced from a very broad base of suppliers.

(1) Due to the recognised difficulty of discerning between revenue and trade/asset value when collecting data about online sales in financial services, comparisons with other sectors should be interpreted with caution.

There has been little change in the proportion of businesses that are measuring the total cost of technology

Around half of businesses systematically measure the cost of technology

Fig 8.3a Measuring the total cost of technology to the business 2003 to 2004 (%)



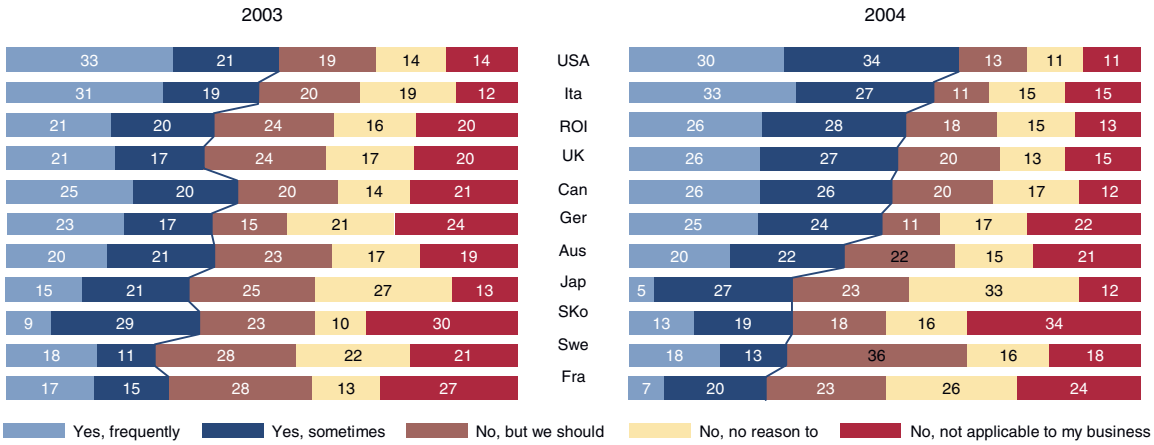
Question: "Do you measure the total cost of technology to your business (e.g. training, staff, employee time, efficiencies)?"
Base: All businesses with technology

- Measurement of the total cost of technology is an important element in assessing the return on investment (ROI) of ICT and their potential benefits.
- Survey-wide there has been a slight decline in the proportion of businesses with technology measuring the costs of ICT, with significant drops in Japan (down 12 percentage points) and South Korea (down 10 percentage points):
  - The proportion of Japanese businesses with technology measuring costs has fallen predominantly amongst large businesses;
  - In contrast, the fall in the proportion of South Korean businesses with technology measuring costs has been predominantly amongst micro and small sized businesses.
- Swedish businesses are still the most likely to measure the cost of their ICT:
  - 50% of Swedish businesses with technology measure costs frequently and 21% measuring costs on an occasional basis.

In contrast, significantly more businesses are now measuring the benefits of ICT

There has been a significant increase in the number of businesses that are measuring the benefits of ICT

Fig 8.3b Measuring the full benefits of technology to the business 2003 to 2004 (%)



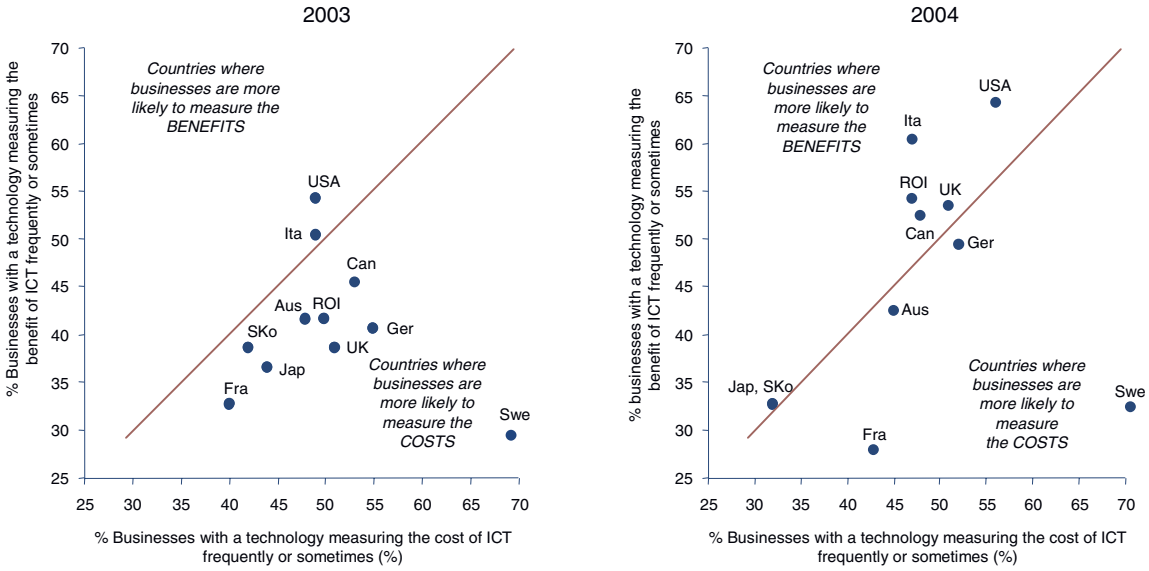
Question: "Do you evaluate/measure the full benefits of technologies to your business (e.g. time efficiencies, expanded customer base)?"
Base: All businesses with technology

- The proportion of businesses with technology that measure the benefits of technology have increased in most countries.
- Increases in the proportion of businesses with technology measuring benefits – either frequently or sometimes – were highest in the UK (up 15 percentage points), Ireland (up 13 percentage points), USA and Italy (both up 10 percentage points).
- In several countries, including Italy, the USA and Ireland, the proportion of businesses that measure benefits is higher than those that measure costs. This is surprising because measurement of costs is a pre-requisite for effective measurement of benefits.
- The proportion of businesses with technology measuring benefits declined in France, Japan, and South Korea.

Businesses are increasingly measuring the benefits, in addition to the costs, of ICT

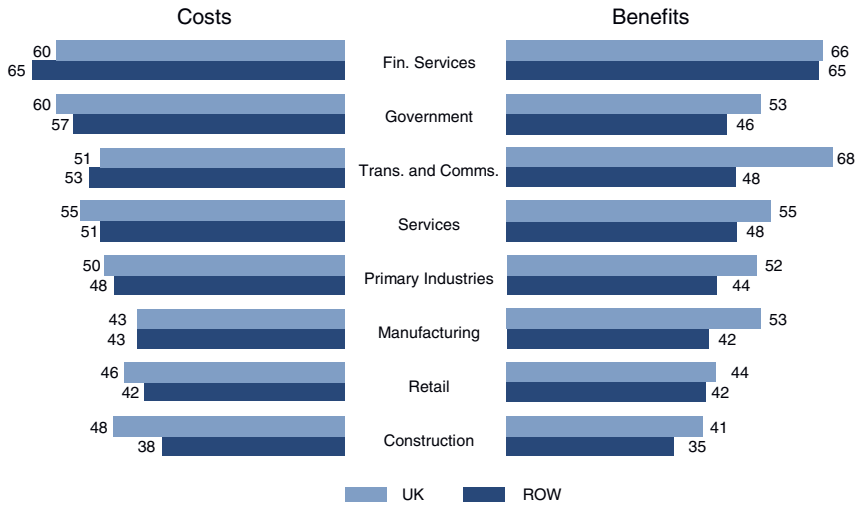
Businesses have shifted their focus towards the measurement of benefits

Fig 8.3c Measuring the total costs and benefits of technology to the business (%)



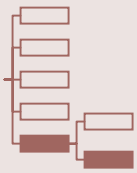
- There is a broad correlation between the proportion of businesses in each country that measure the costs of technology and the proportion that measure the benefits.
- Figure 8.3c illustrates the shift in focus of businesses towards the measurement of benefits from 2003 to 2004:
  - In 2003, only businesses in the USA and Italy were more likely to measure the benefits than the costs of ICT – now, businesses in all but 4 of the countries surveyed do so, with the USA and Italy still leading in this respect.
- Survey-wide, financial services businesses are the most likely to measure the costs and benefits of technology. Construction and retail businesses are the least likely to measure the costs and benefits.

Fig 8.3d Measuring the costs and benefits of technology - sector comparison (%)



Question: "Do you measure the total cost / full benefits of technology to your business (e.g. training, staff, employee time, efficiencies)?"
Base: All businesses with technology

Businesses are increasingly measuring the benefits, in addition to the costs, of ICT (cont'd)



Discussion of drivers

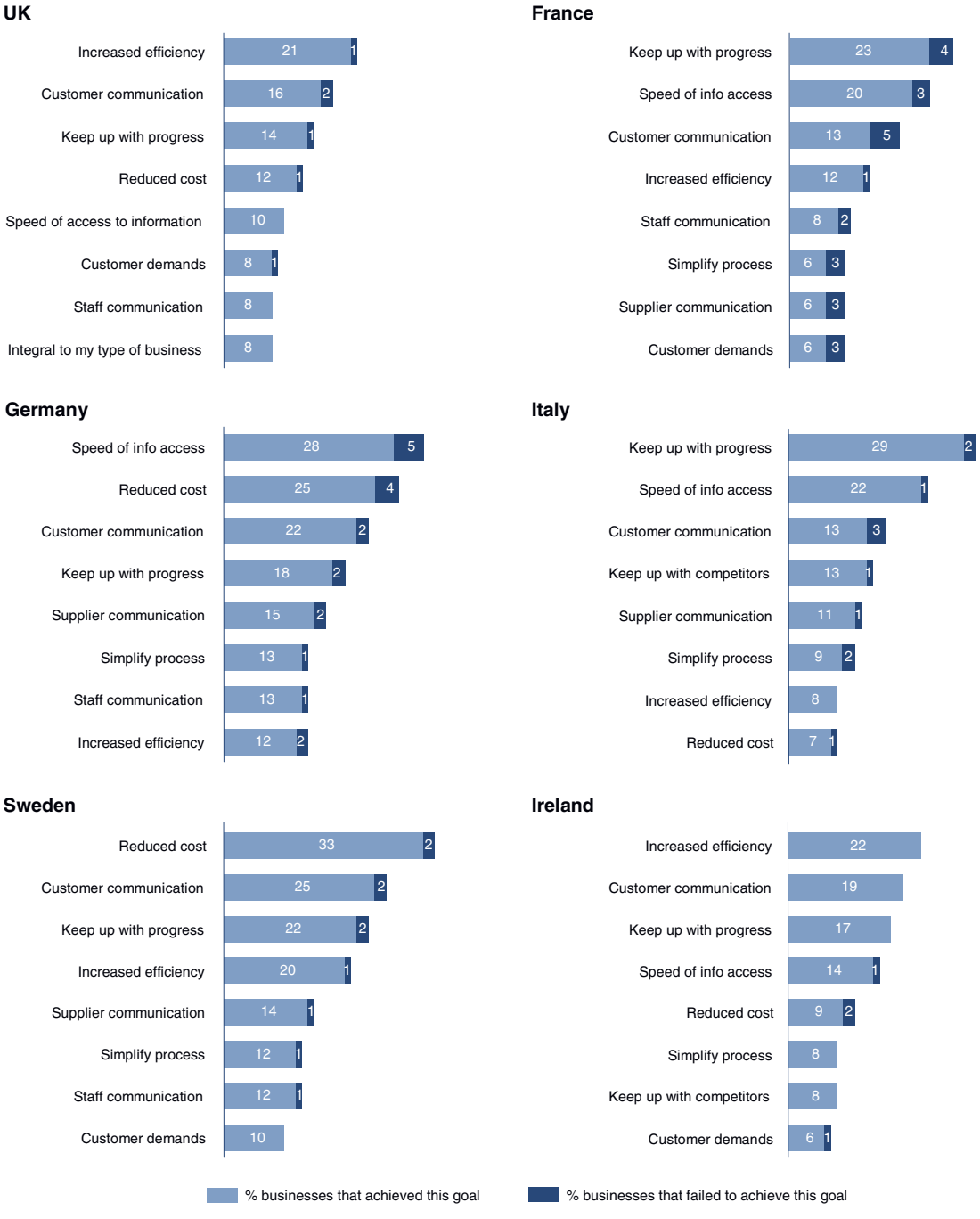
- Measuring the benefits of technology is more difficult than measuring the costs because of the wide variety of forms that benefits can take, be they financial or strategic, immediate or delayed.
- One ICT provider commented that the increase in the proportion of businesses that are measuring the benefits of ICT reflects businesses' shift in focus from hard costs to soft factors, such as growth and competitive advantage. A government technology expert noted that this is indicative of businesses becoming more sophisticated in their use of ICT: "Following the dot.com crash ICT budgets were slashed and businesses became increasingly cost focused. However, some businesses got badly burnt by selecting the lowest cost solutions. In response to this businesses have started to consider other factors, such as potential benefits, in addition to cost."
- As noted in Focus 6ii, managers responsible for IT are increasingly being asked to justify their budgets requests and many are now using metrics such as Return on Investment (ROI), IRR and NPV to assess ICT investments(1).
- The fall in prices of many ICT technologies over the past 12 months has also contributed to the shift in focus from costs. Prices of basic broadband connectivity have fallen by over 60% in some countries(2), making it a viable option for many more businesses. Businesses are now faced with more technological options and more ways they can spend their ICT budgets; this makes the assessment of technology benefits more important.
- The proportion of government organisations that measure the costs of technology compared with the proportion that measure benefits is, on average, higher than for private sector businesses (Fig 8.3d). This may reflect the greater emphasis that external monitors of government organisations have traditionally placed on costs than benefits and also the fact that costs have often been easier to measure than benefits in public sector contexts.

(1) CSI/FBI Computer Crime and Security Survey: Computer Security Institute
(2) Ofcom: The Communications Market 2004 - Telecommunications

Keeping up with progress and improving efficiency are the most commonly cited drivers of adoption

- Figure 8.3e below shows the main drivers of ICT adoption among businesses in each country and to what extent these drivers were realised.
- Keeping up with progress and improving efficiency are the most commonly cited drivers of adoption, ahead of reduced cost, the main driver cited in 2003.
- Businesses in France, Germany, Italy and Australia are the least likely to realise the benefits that they planned to achieve when considering the main drivers.

Fig 8.3e Highest overall drivers of ICT adoption, and their level of realisation



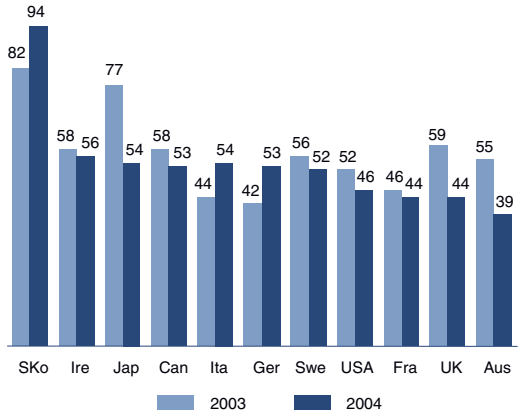
Keeping up with progress and improving efficiency are the most commonly cited drivers of adoption (cont'd)

Fig 8.3e Highest overall drivers of ICT adoption, and their level of realisation

Questions: "What were the main reasons for adopting the online technologies you currently have?" and "which of these reasons have been realised?"
Base: All businesses with technology

Businesses are realising fewer additional benefits from implementing ICT as a result of increased planning

Fig 8.3f Proportion of businesses achieving additional benefits from adopting online technologies 2003 to 2004 (%)



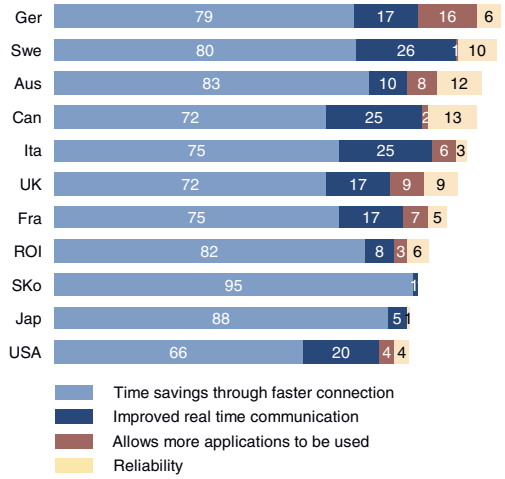
Question: "Were there any other benefits gained from implementing those online technologies?"
Base: All businesses with a technology

On average, half of all businesses realised additional benefits other than those that drove the initial ICT implementation

- Most countries show a decrease in the percentage of businesses with technology realising additional benefits:
  - Japanese businesses show the largest drop (down 22 percentage points).
- The general drop reflects the increase in businesses' awareness of benefits. More benefits are planned and as a result fewer additional benefits are recognised.
- Businesses with technology in South Korea are the most likely to realise additional benefits (other than those driving the implementation).
- However, it is interesting to note that businesses with technology in South Korea are also among the least likely to measure benefits (Fig 8.3b). This is consistent with the trend that greater awareness of benefits is leading to an overall reduction in the number of additional benefits that are realised.

Time savings are the most often cited benefit of faster connections

Fig 8.3g Benefits reported by businesses following a connection upgrade (%)



Question: "Have you seen any benefits as a result of the upgrade?"
Base: All businesses that have upgraded their connection in the last 2 years

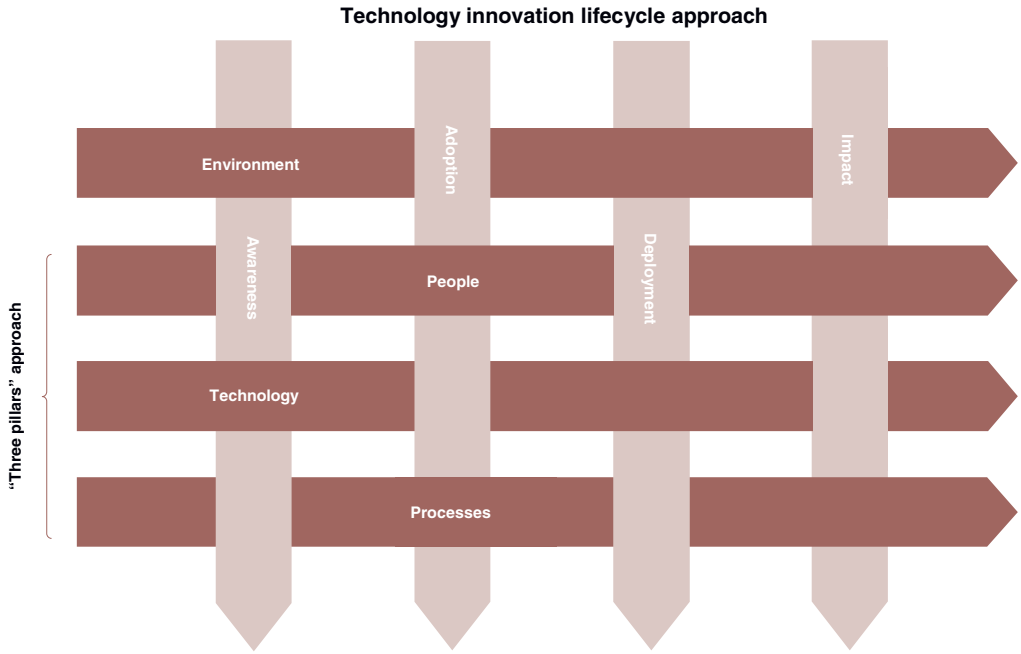
Time savings through faster connections are unsurprisingly the most commonly perceived benefit of an upgrade in connection speed.

- The proportion of businesses that have upgraded their connection speed in the last two years that report time savings is highest in South Korea and Japan, the two countries with the highest broadband penetration.
- Businesses in the USA who have upgraded their connection speed in the last two years are the least likely to report that speed of connection was a benefit.
- Survey-wide, less than one in ten businesses who have upgraded in the last two years reported "being able to use more applications" as a benefit of a connection upgrade. This implies that new applications which require greater bandwidth have not been a significant driver of faster connections.

9. Sophistication Index

The enhanced Sophistication Index introduced in 2003 has been further improved for 2004

Fig 9.1a Structure of the Sophistication Index



Structure of the index

- In last year's survey, a new Sophistication Index was introduced, based on a broad range of metrics, as a means of measuring businesses' ICT sophistication.
- The purpose of the index is not just to measure overall ICT sophistication, but to enable a more granular understanding of the nature of that sophistication and its drivers across a range of different factors.
- The newer index is a hybrid of two established sophistication measurement approaches:
  - The **Technology Innovation Lifecycle** approach, which captures the phased nature in which ICT is adopted:
    - Awareness – the ability to make an informed decision;
    - Adoption – Decision-making, ownership of, or access to, particular resources;
    - Deployment – Usage and optimisation of particular resources;
    - Impact – The outcomes realised from the adoption and deployment of particular resources (ultimately financial) - can be both positive and negative.
  - The **Three Pillars** approach, which segments key areas of commerce which ICT may affect:
    - People – the leadership, skills and culture of business;
    - Technology – Online platforms and applications;
    - Processes – Buy-side, sell-side and inside processes which support specific business functions, which form the underpinning of the three pillars;
    - And surrounding them all, environment – competition, government, customers, suppliers and other influencers.

The enhanced Sophistication Index introduced in 2003 has been further improved (cont'd)

Structure of the index

- The index comprises a sub-set of the indicators tracked by the survey (50 in all) selected on the basis that they illustrate some aspect of ICT sophistication.
- Within the index there is a hierarchy of indices ranging from an overall sophistication index down to scores at the indicator level (question level).
- Each index, whether at indicator, micro, sub or overall level is calculated at the respondent level and has a score between 0 and 1; the higher the score the more favourable the inference.
- A micro-index is the interaction of 2 sub-indices, for example: People/Awareness. This particular micro-index consists of indicators pertinent to "People" and "Awareness" issues. Micro-indices provide a reporting structure to enable the detailed assessment of the broader defined sub-indices.
- Each micro-index is estimated by calculating the average index score from a selection of indicators (questions) that are relevant to that particular micro-index.
- The relevant micro-index scores are combined to create an overall sub-index score using an arithmetic mean (average) approach.
- To calculate the index at the overall level, the sub-index scores are combined. This produces an index score that reflects the structure of both the "Technology Innovation Lifecycle" approach and the "Three Pillars" approach.
- As with any compound index, a country can obtain a high ranking either by performing consistently well across many indicators, or by delivering outstanding results in a fewer number of indicators.

Changes to the 2004 Sophistication Index

- This year, a number of further improvements have been made to the Sophistication Index used in 2003.
- These changes fall into three categories[(1)]:
  - Amendments to existing indicators (or creation of new indicators) to capture new ICT, such as Voice over IP;
  - Refinements to indicators to increase focus on *ICT* sophistication, e.g. measuring whether government regulations have constrained businesses *in the use of ICT* rather than constrained businesses generally;
  - Refinements to the scoring for various indicators, again to capture a more accurate view of the level of ICT sophistication, e.g. to account for the inter-dependencies of the benefits of deploying ICT;
- The resulting index provides a more granular and accurate understanding of ICT use in the 11 countries surveyed.
- As a consequence of these improvements, direct comparability with last year's results is not possible for some indicators, and occasionally, the scoring changes have led to a "harsher" assessment of an indicator, e.g. in which the same response last year would have received a higher score.

(1) Details of these changes may be found in the Technical Appendix , which is available online at www.dti.gov.uk or www2.bah.com/dti2004

Sweden tops the Sophistication Index in 2004 followed by Ireland and the UK

Overall results

- Sweden, Ireland and the UK are the leaders in this year's overall Sophistication Index and are separated by a margin of less than 1 index point; Ireland is the only one of these countries to have been in the top three last year, when it held top spot.
- Japan, France and Italy occupy the bottom three positions, as they did last year.
- Somewhat surprisingly, there have been a number of declines at the overall index level, as well as at the sub-index level.
- While most of the declines are not statistically significant, some are nonetheless notable, particularly for the USA, Canada and Japan.
- These significant declines are the result of two drivers:
  - Real declines in the indicators themselves[1];
  - The refinements made this year, which have led to an overall harsher index and, due to varying ICT profiles, have impacted each country to differing degrees.
- The following section discusses the overall results.

Fig 9.2a Results of the 2004 Sophistication Index

Overall Index

	2003	2004
Sweden	0.51	0.54
Ireland	0.53	0.53
UK	0.49	0.53
Germany	0.51	0.51
S. Korea	0.50	0.50
Canada	0.52	0.50
USA	0.52	0.49
Australia	0.49	0.49
Italy	0.45	0.45
Japan	0.47	0.43
France	0.42	0.41

Environment

	2003	2004
Swe	0.39	0.45
SKo	0.39	0.42
ROI	0.40	0.41
USA	0.41	0.41
Ita	0.39	0.41
UK	0.38	0.41
Can	0.42	0.40
Ger	0.39	0.40
Aus	0.37	0.39
Fra	0.35	0.34
Jap	0.39	0.33

People

	2003	2004
ROI	0.62	0.62
UK	0.58	0.60
Can	0.59	0.60
USA	0.58	0.59
Ger	0.58	0.58
Aus	0.58	0.56
SKo	0.57	0.56
Swe	0.54	0.55
Jap	0.56	0.51
Ita	0.51	0.50
Fra	0.50	0.47

Awareness

	2003	2004
SKo	0.62	0.66
ROI	0.62	0.62
UK	0.59	0.62
Can	0.60	0.61
Ger	0.61	0.61
USA	0.60	0.61
Swe	0.57	0.60
Aus	0.58	0.59
Ita	0.55	0.54
Fra	0.50	0.51
Jap	0.51	0.50

Technology

	2003	2004
Swe	0.61	0.64
ROI	0.63	0.62
UK	0.57	0.62
Ger	0.61	0.61
SKo	0.59	0.59
Can	0.60	0.58
USA	0.61	0.58
Aus	0.56	0.57
Ita	0.57	0.55
Jap	0.57	0.54
Fra	0.51	0.49

Adoption

	2003	2004
Swe	0.53	0.57
ROI	0.53	0.53
UK	0.49	0.53
Ger	0.51	0.52
SKo	0.51	0.50
Can	0.53	0.48
USA	0.51	0.47
Aus	0.47	0.47
Ita	0.44	0.45
Fra	0.41	0.43
Jap	0.49	0.43

Process

	2003	2004
Swe	0.47	0.50
UK	0.45	0.47
ROI	0.48	0.46
Ger	0.46	0.45
USA	0.47	0.43
Can	0.48	0.43
Aus	0.44	0.42
SKo	0.43	0.41
Ita	0.41	0.40
Fra	0.35	0.34
Jap	0.37	0.31

Deployment

	2003	2004
Swe	0.41	0.44
UK	0.40	0.44
ROI	0.45	0.43
Aus	0.42	0.41
Can	0.44	0.41
Ger	0.42	0.39
USA	0.43	0.38
SKo	0.37	0.36
Jap	0.42	0.36
Ita	0.35	0.33
Fra	0.34	0.29

Impact

	2003	2004
USA	0.54	0.55
ROI	0.52	0.54
Ita	0.53	0.53
Swe	0.50	0.52
Can	0.52	0.51
Ger	0.51	0.51
UK	0.50	0.51
Aus	0.49	0.47
SKo	0.47	0.46
Fra	0.46	0.43
Jap	0.48	0.42

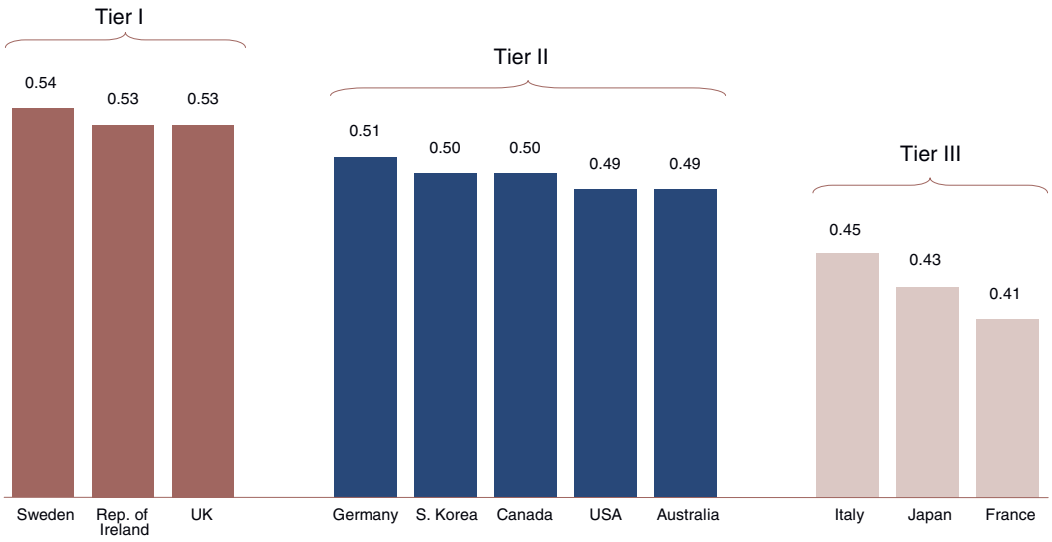
(1) In many cases, these declines are not supported by corroborating evidence from other research and may therefore be a reflection of the difference in time-frames between this research and other research, or indeed, a reflection of the difficulty of collecting such highly technical information.

Sweden tops the Sophistication Index in 2004 followed by Ireland and the UK

Overall Results (cont'd)

- In terms of absolute positions, there are 3 distinct groups of nations – the leaders – "Tier I", the intermediates – "Tier II" and those trailing – "Tier III"[1].

Fig 9.2b Performance groupings, 2004 Sophistication Index



Source: IBS 2004

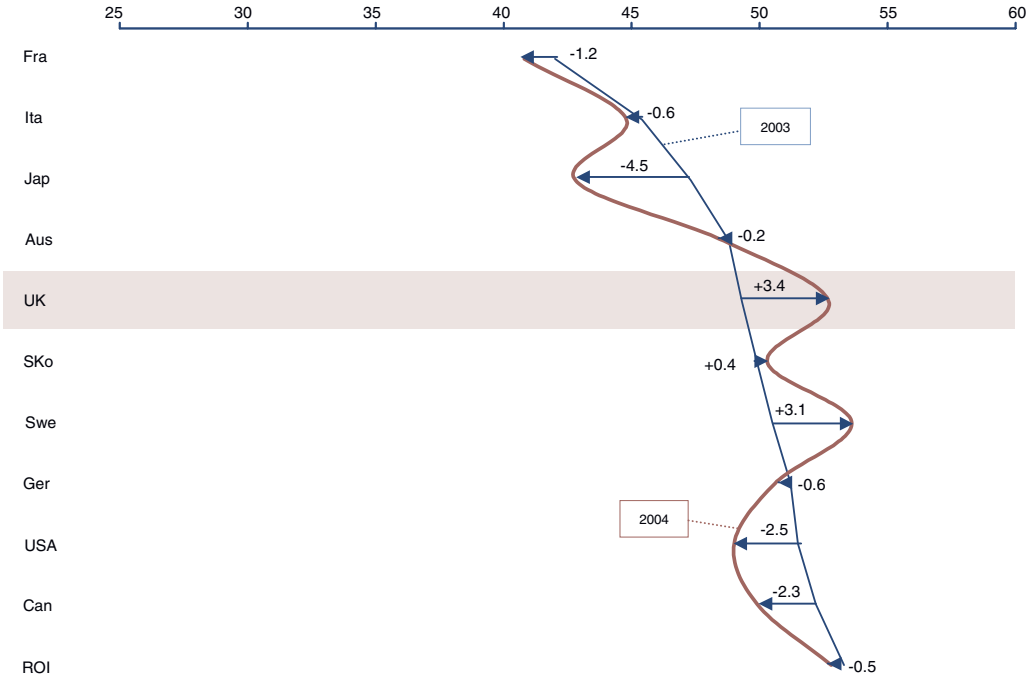
(1) The groupings are defined by an analysis of significant difference among all country results, using a threshold of -/+5%.

Sophistication of UK businesses is growing at the fastest rate

Overall Results (cont'd)

- The table below reflects the overall performance of each country surveyed in 2004, compared to the results from 2003.
- Only the UK and Sweden show improvements from 2003, while Japan, the USA and Canada show notable declines. All other countries have effectively remained at the same overall level of ICT sophistication.
- For the UK and Sweden the net result is an increase in ranking from 7th to 3rd and 5th to 1st respectively.

Fig 9.2c "Year-on-year change"



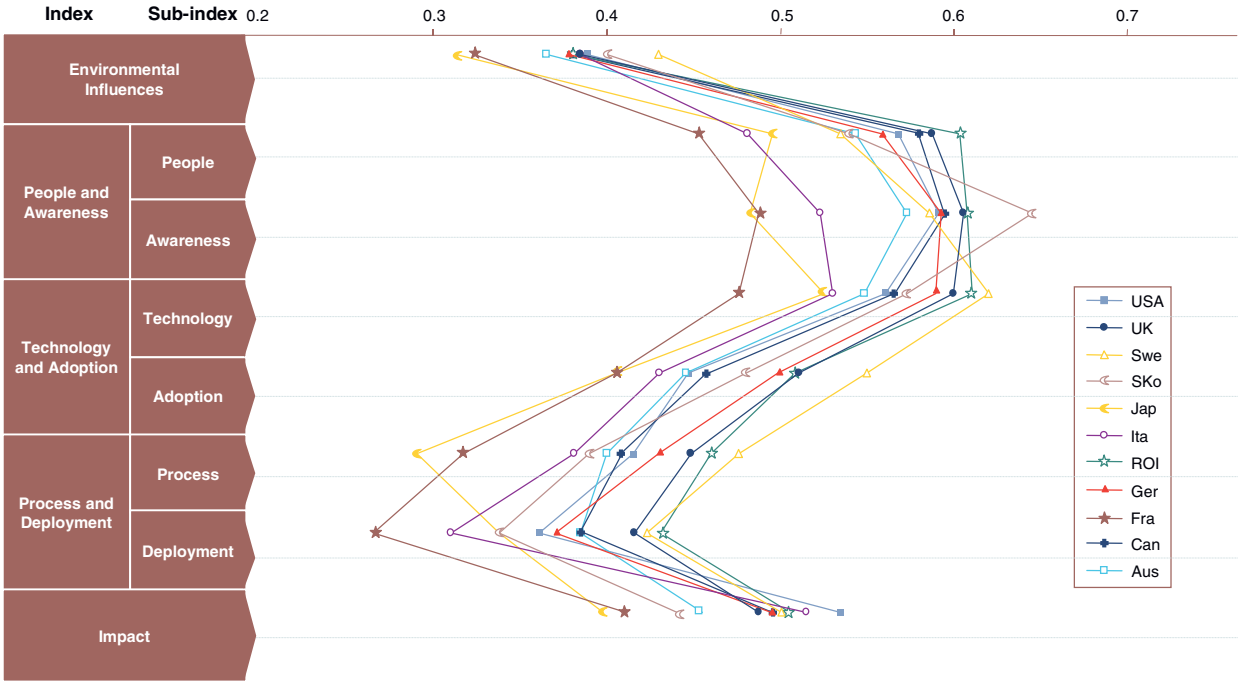
Source: IBS 2004

As in 2003, most nations are more sophisticated in People, Awareness and Technology than other sub-indices

Overall Results (cont'd)

- All nations perform significantly better in People, Awareness and Technology sub-indices when compared to other sub-indices – this is to be expected, as these sub-indices represent some of the foundation layers of ICT sophistication, upon which increasing sophistication is dependent.
- The most significant variation amongst countries' performance is in People, Awareness, Process, and Deployment, as opposed to Environmental Influences and Impact, which are more closely clustered together.

Fig 9.2d Mapping of nations' overall Sophistication Index scores



Source: IBS 2004

Sweden has jumped from fifth place in 2003 to first place in 2004

Leading nations ***Sweden***

- Sweden tops the 2004 Sophistication Index, as a result of its top ranking in five of the eight sub-indices: Environment; Adoption; Technology; Process and Deployment.
- These outstanding scores compensate for the comparatively lower scores obtained by Sweden in terms of the Impact, Awareness, and People sub-indices, in which it lies 4th, 7th and 8th place, respectively.
- Environment
  - Sweden displays its most impressive improvement on last year's index in the environment sub-index, recording an increase of 6 index points.
  - Sweden's strong improvement has been driven primarily by:
    - The degree to which Swedish business are influenced by the wider business community with respect to ICT decisions which increased from a mean score of 2.64 in 2003 to 4.6 in 2004(1);
    - An increase of 22% to 35 % in the number of Swedish businesses interacting with government through e-mail;
    - A sharp rise of 10 percentage points (from 8% to 18%) in the proportion of Swedish businesses making online payments to the government.
  - Swedish businesses are the most likely to gain/share technology information with customers and suppliers, and to interact online with government.
- Technology
  - Most Swedish businesses have implemented simpler ICT such as an internet connection and e-mail.
  - Swedish businesses are consistently among the most likely to have implemented more advanced ICT from intranet though to WAN, with significant growth evident.
  - For example, over two-thirds of businesses now use remote or mobile terminals, 9 percentage points more than in 2003.
  - Internet connection speeds in Sweden are among the most likely to be of a higher bandwidth, enabled by Sweden's highly developed broadband supplier environment.
- Process and Deployment
  - E-commerce is particularly strong in Sweden and growth is apparent, with Swedish businesses the most likely to participate in online transactions:
    - 65% of businesses make payments online, up 10 percentage points from 2003;
    - 54% of businesses allow customers to order online, up 3 percentage points from 2003;
    - Sweden ranks joint second with Australia behind South Korea in the proportion of businesses enabling customers to make payments online and has seen the greatest growth in this indicator, which increased by 14 percentage points to 33% of businesses in 2004.
  - Sweden's continuing lead in e-commerce can be attributed to several factors including a strong general affinity for technology, the high uptake of enabling technologies such as broadband and a familiarity and acceptance of "remote" shopping.
  - This favourable mindset is further bolstered by the existence of technological enablers such as widespread broadband and online banking.

(1) Mean score of survey respondents on a scale of 0 (low) to 10 (high).

Ireland occupies second place, with the UK close behind in third position

Ireland

- Ireland comes second in the overall Sophistication Index, marginally ahead of the UK. Its high overall position results from its consistently strong performance – in all sub-indices Ireland ranks in the top three.
- People
  - Irish businesses are among the most confident in their ICT skills and are most likely to report that the IT skills of employees meet the needs of the business either 'completely' or 'mostly'. Moreover almost 60% of businesses believe their skills optimise ICT usage.
  - Businesses and their employees are also most likely to exhibit positive attitudes to new ICT.
- Awareness
  - While showing an average propensity to measure costs, Irish businesses are among the most likely to measure the benefits of technology, indicating a more sophisticated approach to ICT use. This leading position is reinforced by the significant growth in this area: 54% of Irish businesses with an ICT measure benefits this year, versus only 41% last year.
- Technology and Adoption
  - In addition to a very high level of internet connection (99%), Irish businesses are amongst the most likely to have a website and, of those which do not operate a website, Irish businesses are the most likely to be either currently setting one up or considering it.
  - Ireland also excels in the adoption of more advanced ICT, such as WAN, LAN and VoIP.

UK

- The UK ranks third in the 2004 Index, which is an improvement of four places from last year and a result of solid gains in many of the sub-indices, the most notable of which are discussed below.
- People and Awareness
  - The increasingly sophisticated outlook to ICT of UK businesses is particularly evident in their approach to measurement of ICT as well as ICT skills:
    - Many more UK businesses using an ICT now measure the benefits of ICT, with a rise of 15 percentage points, from 38% of businesses to 53%;
    - UK businesses are also more actively addressing their ICT skills – 69% of businesses that identify gaps in ICT skills now use regular or ad hoc training to address such gaps, up from 50% last year.
- Technology and Awareness
  - UK businesses have shown a marked increase in the adoption of advanced ICT this year:
    - xDSL use has almost doubled amongst all UK businesses (13% to 24%) and over 75% of broadband connections are in the 500 Kbits to 5 Mbits range of bandwidth;
    - UK businesses lead in use of Wireless LAN, and are among the leaders of remote/mobile terminals, Voice over IP and desktop video conferencing.

The USA and Canada have fallen in the 2004 Sophistication Index

- Process and Deployment
  - UK businesses are deploying ICT more deeply into their processes and operations than ever before:
    - Of businesses with an internal network, 70% already have or intend to integrate their internal systems to improve information sharing across their organisation, an increase of 8 percentage points;
    - The proportion of businesses using online banking has increased 18 percentage points, while the proportion of businesses using online invoicing and stock taking has increased 14 and 10 percentage points respectively.

Other countries of note

USA

- The USA is of note due to its drop to 7th in the Sophistication Index from 3rd in 2003.
- This drop in ranking is primarily the result of stagnation or slight declines in many indicators, combined with improvements by other nations. Some declines were more significant and the most notable decreases are observed in the more advanced sub-indices of Technology, Adoption and Deployment:
  - Businesses placing orders online and tracking order progress online are down 5 and 8 percentage points respectively;
  - Use of e-marketplaces has declined from 26% of USA businesses to 15%;
  - Despite these drops, the USA ranks 1st in terms of impact, with online channels contributing significant proportions of sales and procurement activity.

Canada

- Canada shows a drop of similar magnitude to that of the USA, falling to 6th from 2nd in 2003. As in the USA, Canadian businesses exhibited stagnation or declines in adoption and deployment of many ICT, including use of remote synchronised terminals, Wireless LANS, remote/mobile terminals, as well as Computerised Process Control.

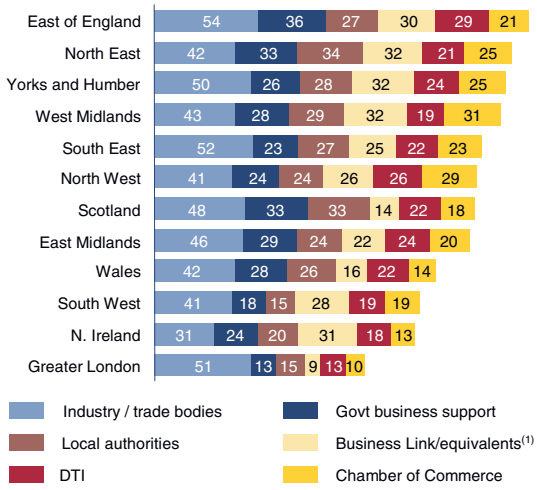
South Korea

- South Korea is of note due to its variable performance in the sub-indices. Despite sitting fifth in the overall Sophistication Index, South Korea is the leader in the Awareness sub-index and second in terms of Environment. Moreover, South Korea has exhibited improvement in these sub-indices, up 4 index points in Awareness and 3 index points in Environment.
- However, South Korean businesses currently under-perform in the more complex sub-indices, such as Process, Deployment and Impact, and in fact have dropped in all three since 2003. This disparity in performance may simply be an issue of timing, and the high levels of awareness and the favourable environment may enable this to change. Continued proactive government intervention and the existent highly developed ICT infrastructure should enhance these prospects.

10. UK Regional Comparisons

The types of organisations with whom businesses gain or share ICT knowledge vary significantly across regions

Fig 10.1a Businesses gaining/sharing ICT knowledge with support organisations (government and non-government) - 2004

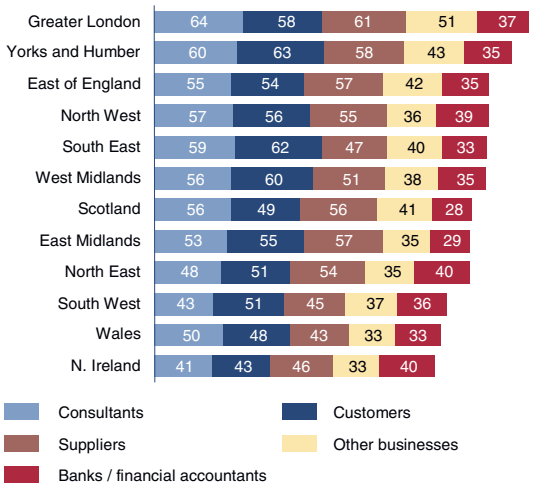


Question: "Do you gain or share technology knowledge/advice with any of the following sources?"
Base: All businesses

Businesses in the East of England and the North East are the most likely to use support organisations to gain or share ICT knowledge

- Across all regions, businesses are most likely to interact with industry/trade bodies to gain or share ICT knowledge.
- There is significant regional variation in the proportion of businesses that use government business support organisations (GBSOs) to gain/share ICT knowledge:
  - 36% of businesses in the East of England use government business support organisations compared to 13% in Greater London.
- Gaining/sharing ICT knowledge with the DTI varies between 13% of businesses in Greater London and 29% of businesses in the East of England.
- Gaining/sharing ICT knowledge with Business Link ranges from 9% of businesses in Greater London to 32% of businesses in the North East, Yorks and Humber and the West Midlands.

Fig 10.1b Businesses gaining/sharing ICT knowledge through business relationships (%) - 2004



Question: "Do you gain or share technology knowledge/advice with any of the following sources?"
Base: All businesses

Within business relationships, ICT knowledge is most commonly shared with consultants, customers and suppliers

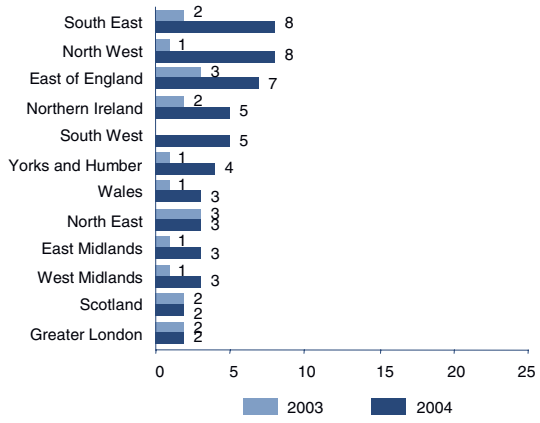
- Businesses in Greater London are the most likely to share ICT knowledge within formal business relationships:
- The high concentration of businesses around the capital facilitates networking.
- Businesses in Northern Ireland and Wales are least likely to share ICT knowledge through business relationships.

(1) Including counterparts to Business Link outside of England such as Invest NI in Northern Ireland, Scottish Enterprise in Scotland and Opportunity Wales.

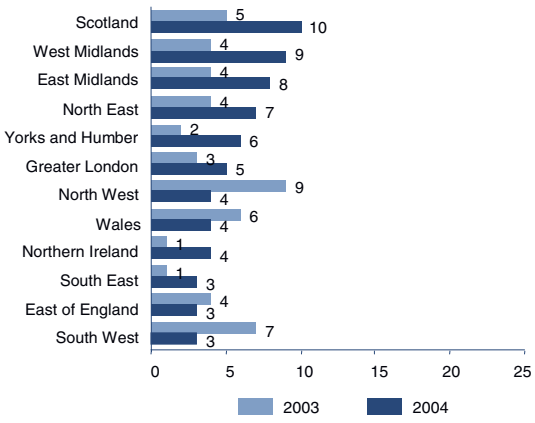
The proportion of businesses making tax payments or linking with local councils is generally up, though changes in other types of interaction have been mixed

Fig 10.1c Businesses methods of online interaction with government (%) – 2003 and 2004

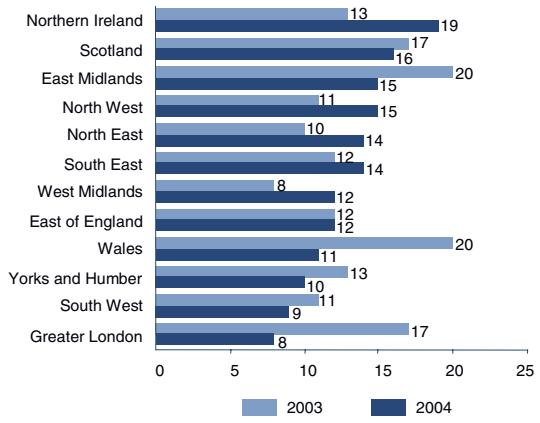
Tax / other payment



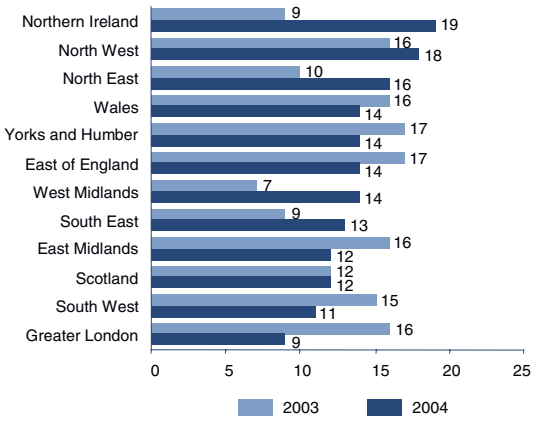
Have a link with local council



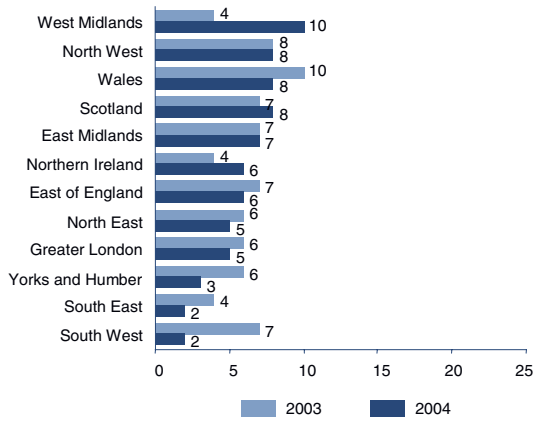
E-mail communication



Look at website



Regulatory information



Question: "Do you have any online interaction with regional, local or central government via…?"
Base: All businesses

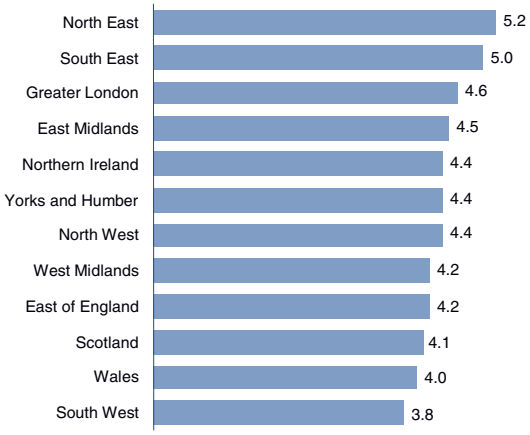
Interaction with government is generally up, especially the proportion of businesses making tax or other payments

Visiting a website has overtaken e-mail as the most common form of online interaction between business and government

- In general, more businesses are now interacting with government organisations through a website than by e-mail:
  - This is to be expected, as many government websites now provide online forms which replace the need for e-mails.
- The number of businesses paying tax online has increased in 9 of the 12 regions:
  - The most significant increases are in the North West (up 7 percentage points to 8%) and the South East (up 6 percentage points to 8%).
- In Northern Ireland there has been a significant increase in the proportion of businesses that interact with government:
  - Businesses in Northern Ireland are now the most likely to interact with government through a website or via email;
  - 19% of businesses in Northern Ireland visit government websites, up 10 percentage points from last year;
  - The proportion of businesses interacting via email increased 6 percentage points.
- The level of interaction between businesses and government has declined in Greater London and the South West, and businesses in these two regions are consistently amongst the least likely to have any form of online interaction with government:
  - The proportion of businesses accessing government websites fell by 7 percentage points in Greater London to 9%, and by 4 percentage points in the South West to 11%;
  - The proportion of businesses in the South West seeking regulatory information fell from 7% to 2%;
  - The proportion of businesses in Greater London using e-mail to communicate with government has fallen from 17% to 8%.

Businesses in the North East perceive the effects of competitive moves in ICT the most, while those in Greater London are the most responsive to such moves.

Fig 10.1d Average rating of competition as a driver for ICT implementation (scaled 1 - 10)

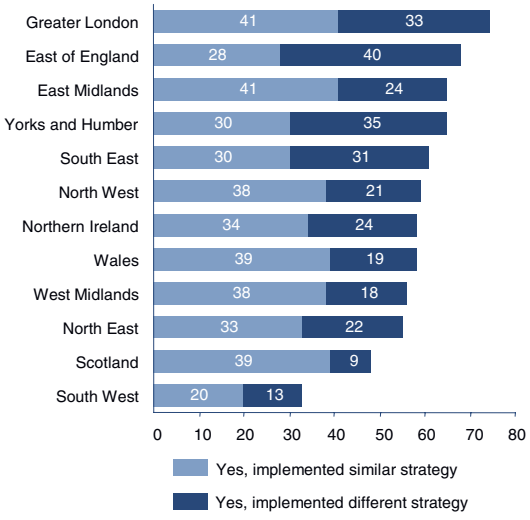


Question: "To what extent does the drive to implement any technology change come from competitors?"
Base: All businesses

Businesses in the North East are the most likely to cite competition as a driver for ICT implementation

- Competition is more likely to drive ICT implementation among businesses in the North East and South East than in regions with a lower concentration of businesses such as Wales, Scotland and the South West.

Fig 10.1e Businesses who have proactively responded to acknowledged competition (%)



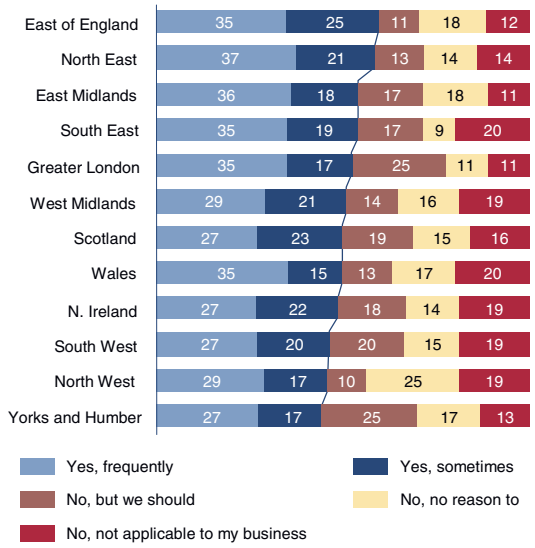
Question: "You mentioned that competitors are one of the drivers to implement technology change in your business. Have you considered any action because of this?"
Base: All businesses who stated that competitors were a large driver

Among those affected by competitor ICT use, businesses in Greater London are the most likely to have responded proactively to perceived competition

- There is significant regional variation in the extent to which businesses which stated competitors were a large driver have reacted.
- Businesses in Greater London are the most likely to have taken action, with the majority implementing a similar strategy as the competitor.
- Businesses in the South West, as well as being the least likely to perceive competition as a driver of ICT investment (Fig 10.1d), are also the least likely to invest in ICT as a result of the actions of competitors:
  - Only 33% of those stating competition to be a large driver in the South West report to have implemented a strategy in response to competition, compared with 74% of businesses in Greater London.
- In most regions, businesses are more likely to implement a similar strategy to competitors than a different strategy.

Businesses in the South East, North East and the East of England are amongst the most likely to measure the costs and benefits of ICT

Fig 10.2a Businesses measuring the cost of technology (%)

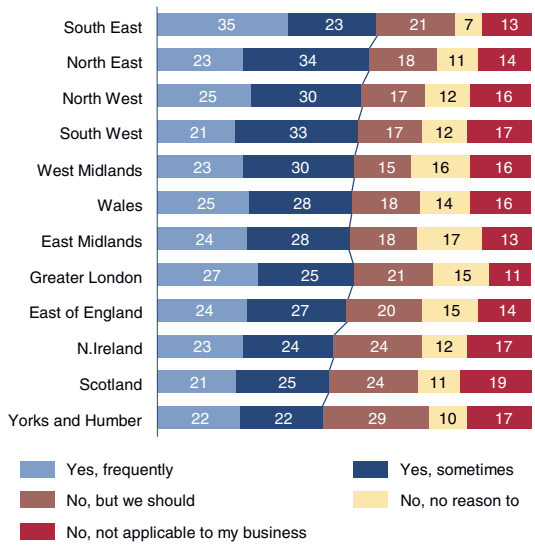


Question: "Do you measure the total cost of technology to your business?"
Base: All businesses with a technology

Businesses in the East of England are the most likely to measure the costs of technology

- Between 44% and 60% of businesses using technology measure the costs of ICT.
- Businesses in Yorkshire and Humberside and Greater London are the most likely to report that they should measure the costs of ICT when they do not do so already:
  - In both these regions, 25% of businesses with a technology are of this opinion.
- Businesses with technology in the North West are the least likely to believe they *should* measure ICT costs if they do not already do so.

Fig 10.2b Businesses measuring the benefits of technology (%)



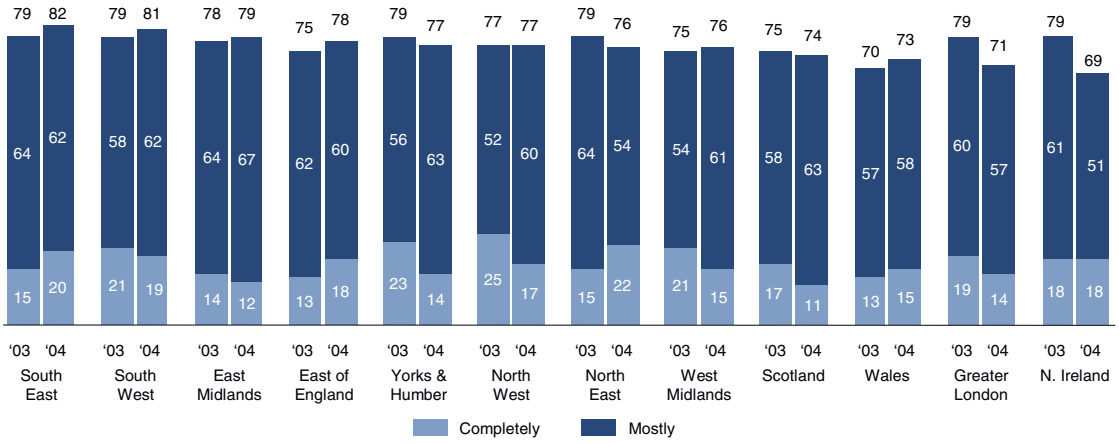
Question: "Do you measure the total benefit of technology to your business?"
Base: All businesses with a technology

Between 44% and 58% of businesses with an ICT measure the benefits provided to their business by those technologies

- Businesses using technology in the South East and North East are the most likely to measure the benefits of ICT.
- Businesses in Yorkshire and Humberside using technology are the least likely to measure the benefits (44%), but the most likely to think that they *should* (29%).
- 20% to 32% of businesses using technology believe there is no reason to measure the benefits of it, or that measurement of benefits is not applicable to their business.

Businesses in the South East are the mostly likely to perceive that their in-house ICT skills are sufficient, though there is little variation across regions

Fig 10.2c Proportion of IT skills meeting the needs of the business (%)



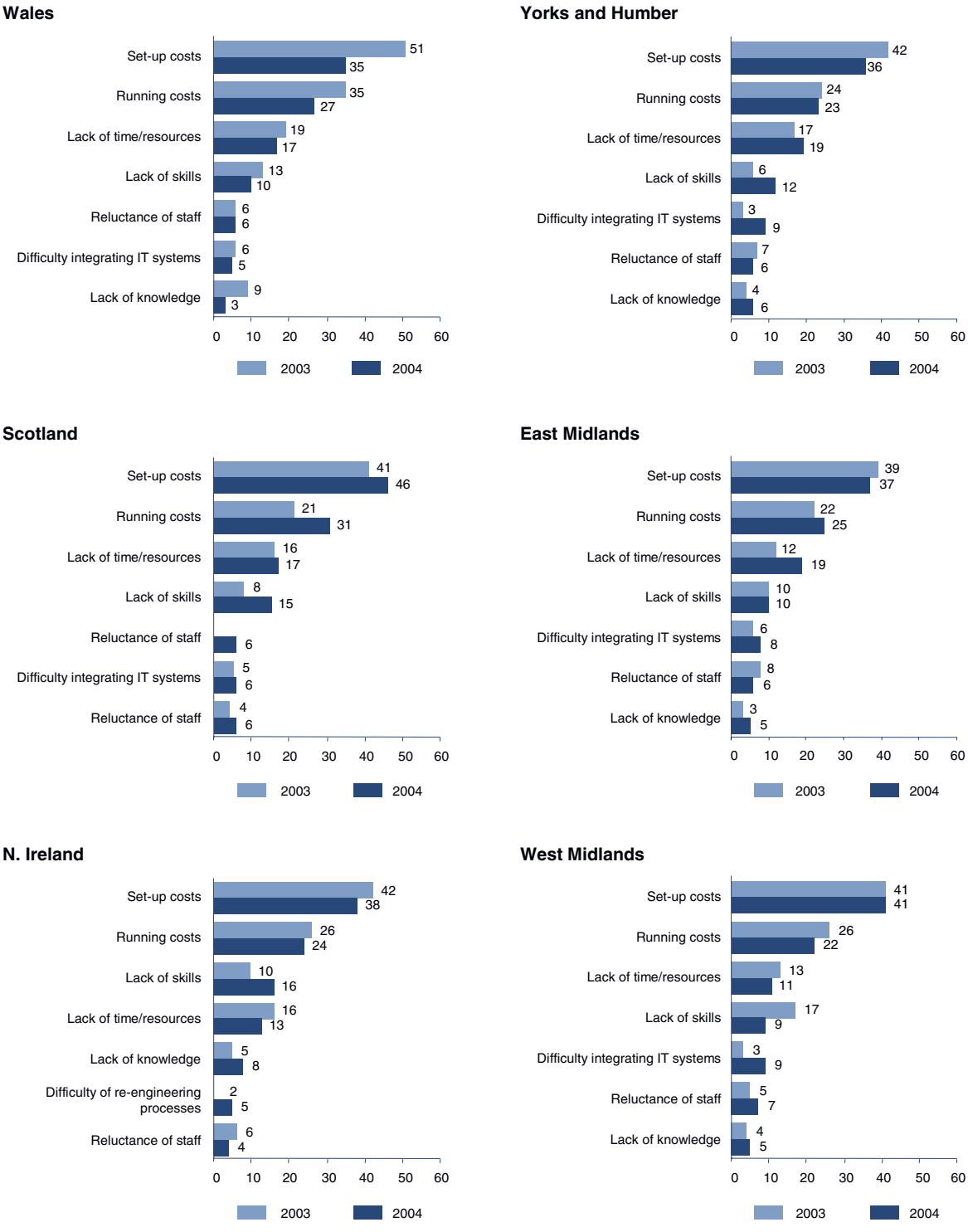
Question: "Do the current ICT skills within your organisation meet the needs of the business?"
Base: All businesses with technology

Between 69% and 82% of businesses with a technology report that the ICT skills of their staff either completely or mostly meet the needs of the business

- Across regions there is little variation in the proportion of businesses with a technology that report that the ICT skills of staff are mostly sufficient:
  - Between 11% (Scotland) and 20% (South East) of businesses with a technology report that the IT skills of their staff are completely sufficient to meet the needs of the business.
- There is also little variation in the perceived skills gap in the regions compared with 2003, with the exception of Greater London and Northern Ireland:
  - In Greater London and Northern Ireland the proportion of businesses with a technology satisfied with the in-house ICT skills has fallen by 8 and 10 percentage points respectively.
- The skills gap is most marked in Northern Ireland:
  - 31% of businesses with a technology feel that the IT skills of their employees do not completely or mostly satisfy the needs of the business.

Set-up and running costs remain the greatest barriers to adoption of technology, although the proportion of businesses citing these as barriers has dropped significantly in several regions

Fig 10.2d Main barriers to implementing technology

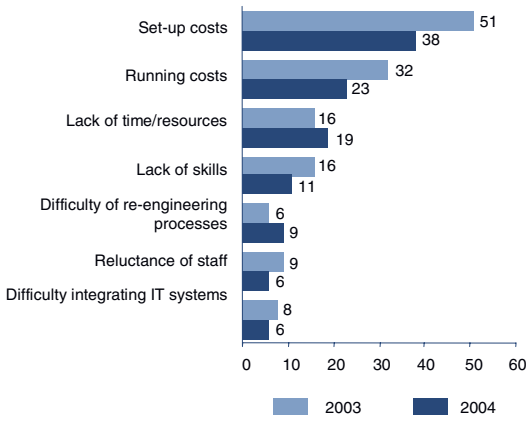


Question: "Can you tell me what made it difficult for you/prevented you from implementing technology?"
Base: All businesses

Set-up and running costs remain the greatest barriers to adoption of technology (cont'd)

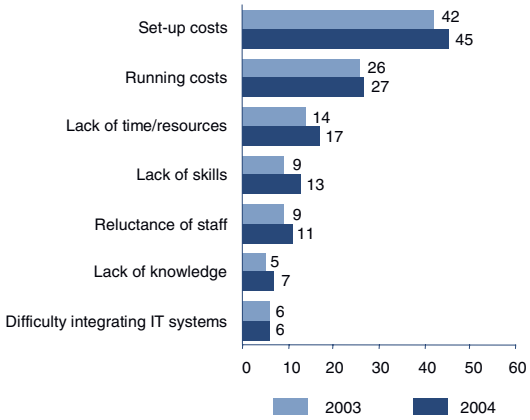
Fig 10.2d Main barriers to implementing technology

North East

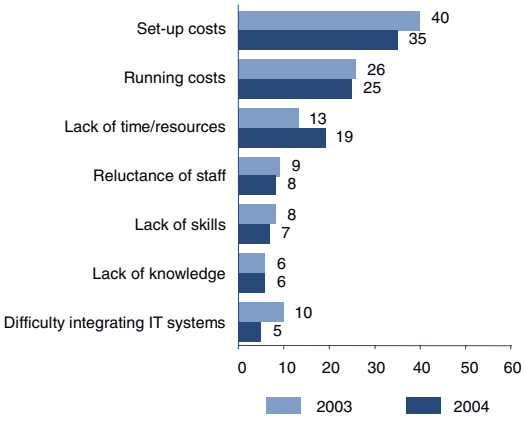


East of England

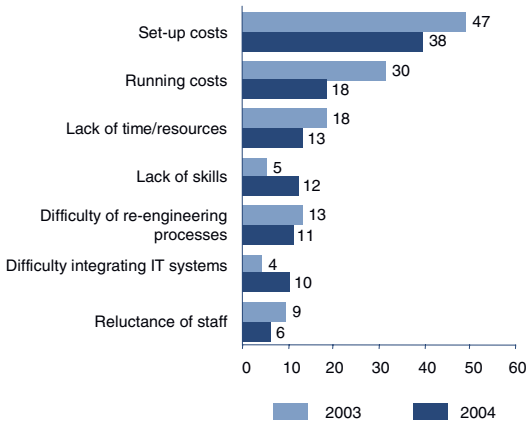
North West



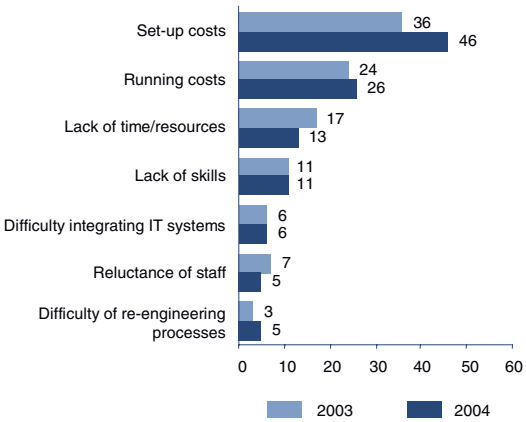
South East



Greater London



South West

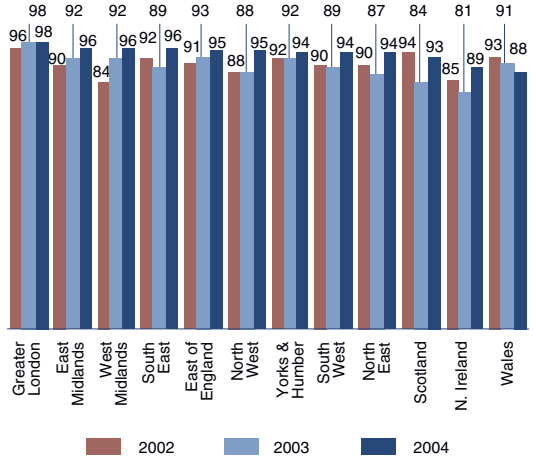


Question: "Can you tell me what made it difficult for you/prevented you from implementing technology?"
Base: All businesses

Basic connectivity metrics, such as “access to the internet” and “use of a website”, have increased significantly in a number of regions

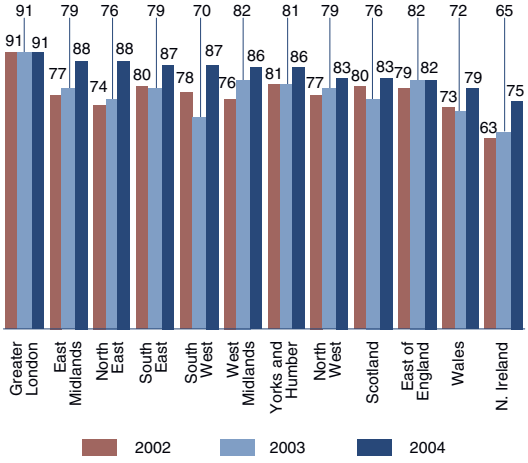
The proportion of businesses with access to the internet, a website and that are using email has increased in nearly all regions

Fig 10.3a Businesses with access to the Internet (%)



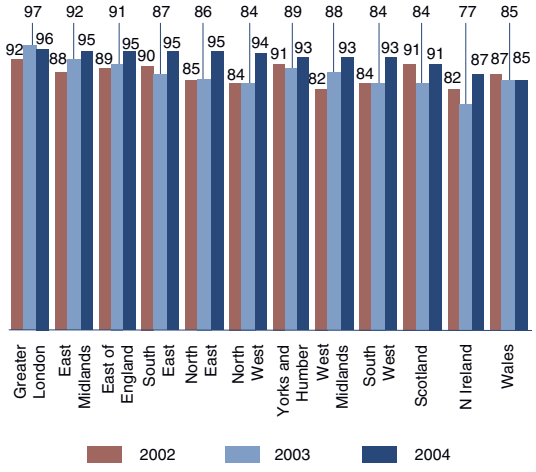
Question: “Does your business have Internet access?”
Base: All businesses

Fig 10.3b Businesses with a website (%)



Question: “Does your business have a website?”
Base: All businesses

Fig 10.3 c Businesses with external e-mail (%)

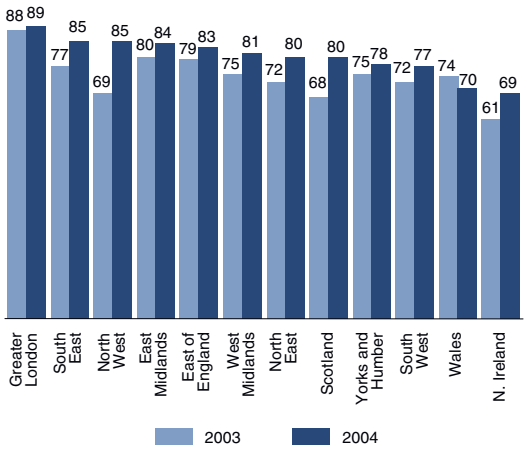


Question: “Does your business have external e-mail?”
Base: All businesses

- In England, the proportion of businesses with internet access appears to be reaching a plateau; between 94% and 98% of businesses now have access.
- Businesses in Greater London are the most connected in terms of internet access, website deployment and use of e-mail.
- Businesses in Scotland, Wales and Northern Ireland are generally the least connected, though Scotland and Northern Ireland have shown significant improvement in all metrics. Businesses in Wales have improved in WANs and websites, though have remained stable or declined in the other metrics.

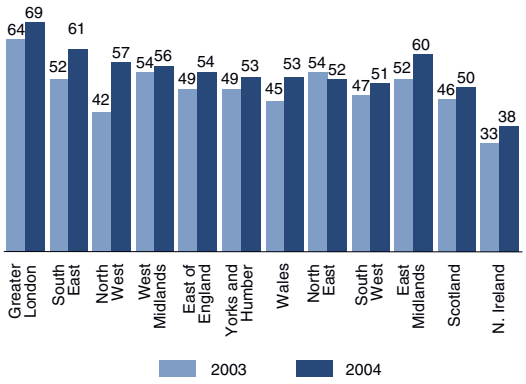
Basic connectivity metrics have increased significantly in a number of regions (cont'd)

Fig 10.3d Businesses with a LAN (%)



Question: "Does your business have a LAN?"
Base: All businesses

Fig 10.3e Businesses with a WAN (%)

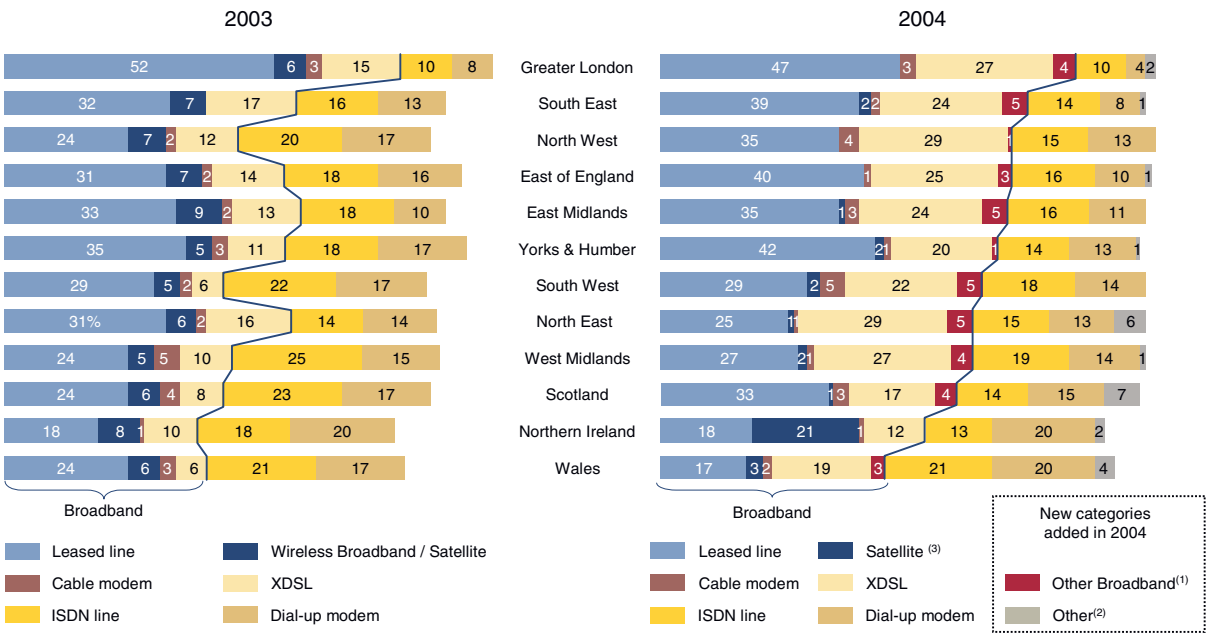


Question: "Does your business have a WAN?"
Base: All businesses

- Overall, there has been a significant increase in the proportion of businesses using both LANs and WANs:
  - Growth has been highest in the North West and the South East.
- As expected, significantly fewer businesses are using WAN than LAN in each of the twelve regions:
  - LANs are used by businesses of all sizes whereas WANs are typically only deployed by large businesses with several geographic hubs.
- Businesses in Greater London and the South East are the most likely to use LANs and WANs.

xDSL has grown significantly in almost all regions

Fig 10.3f Method of connecting to the internet



Question: "How is your Internet connection provided?"
Base: All businesses

- Broadband access has increased in all regions. The proportion of businesses with broadband access has increased most significantly in the North West (up 24 percentage points) and the South West (up 21 percentage points).
- Broadband access is still highest in Greater London (81% of businesses), although there has been little growth since last year.
- xDSL has shown the greatest growth, seemingly at the expense of dial-up connections and ISDN:
  - The proportion of businesses using xDSL grew on average 11 percentage points;
  - Growth in xDSL was highest in the West Midlands and the North West (both up 17 percentage points) and the South West (up 16 percentage points).
- Usage of leased lines has grown in several regions - most significantly in the North West, Scotland and the East of England– but has fallen in others, including Wales and the North East.
- There has been little change in the level of cable penetration and overall adoption remains low (2% of businesses).

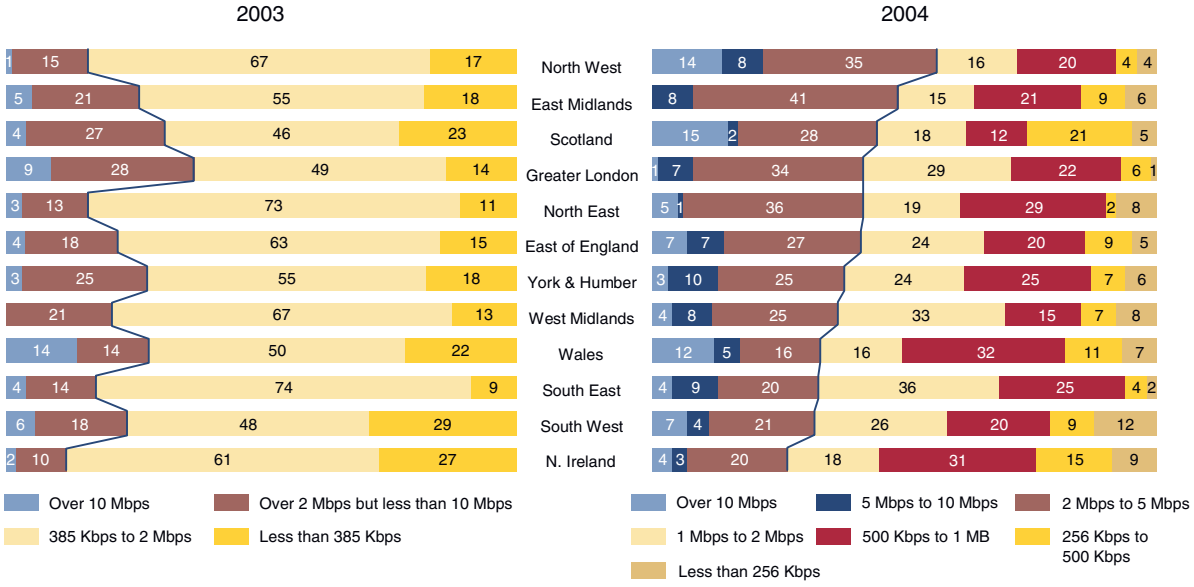
(1) Other broadband includes Fibre, CDN, Radio Link, Frame relay line, Janet, BFLETS and VPN
(2) Other unspecified connections (non-broadband)
(3) Businesses in Northern Ireland were also asked whether they used wireless broadband. These respondents are included in Satellite.

With the increase in the uptake of xDSL, businesses in all regions have also seen an increase in speed of connection

The proportion of businesses with connection speeds over 2 Mbps has increased in all regions

Fig 10.3g Speed of connection to the internet

Bandwidth (%)



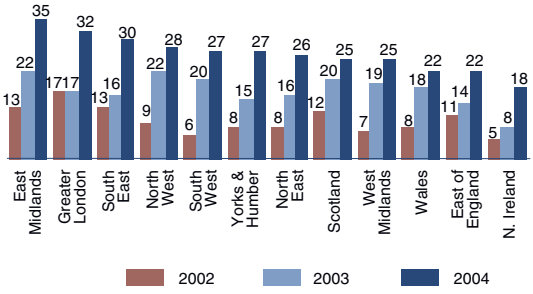
Question: "...and what bandwidth do you have?"
Base: All businesses using a high speed connection (excludes dial-up and ISDN)
Note: 20% of organisations responded 'don't know' to this question. New categories were introduced in 2004

- Unsurprisingly, there is a strong correlation between growth in broadband penetration and growth in the proportion of businesses using a high speed connection:
  - The North West has shown the strongest growth in the level of broadband penetration (up 20 percentage points, see Fig 10.3f) and the proportion of businesses with connection speeds over 2 Mbps (up 41 percentage points);
  - Wales and Greater London have shown little growth in both metrics.
- There has been little change in the proportion of businesses with a high-speed connection using bandwidths of over 10 Mbps, with the exception of the North West and Scotland which have seen increases of 13 and 11 percentage points respectively and in London, where the proportion of businesses with a connection using a bandwidth of more than 10 has fallen 8 percentage points.
- Businesses with high speed connections in Greater London and the South East are the most likely to have connections with a bandwidth over 500 Kbps.

Wireless LAN uptake has grown significantly in all regions whilst the proportion of businesses with an intranet has also generally increased, though at a slower pace

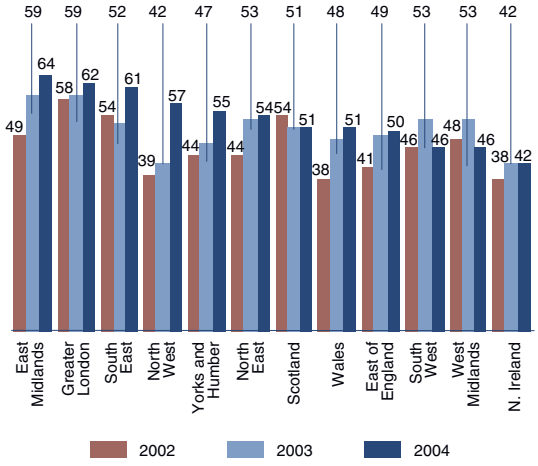
Adoption of wireless LANs is growing rapidly

Fig 10.3h Businesses with Wireless LAN (%)



Question: "Does your business have a Wireless LAN?"
Base: All businesses

Fig 10.3i Businesses with an Intranet (%)

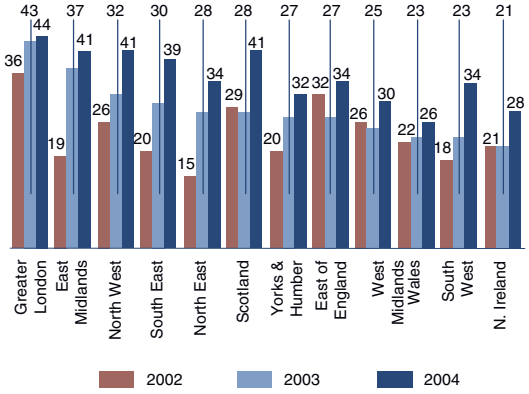


Question: "Does your business have an Intranet?"
Base: All businesses

- Usage of wireless LANs has increased dramatically across all regions:
  - Businesses in the East Midlands remain the most likely to have implemented a wireless LAN (35%), followed closely by business in Greater London (32%) and businesses in the South East (30%);
  - Businesses in Northern Ireland are still the least likely to use the technology (18%), though they recorded an increase of 10 percentage points from last year.
- Between 42% and 64% of businesses have an intranet, and eight of twelve regions have shown increases since last year.
- Businesses in the East Midlands, Greater London and the South East are most likely to use an intranet.
- The greatest increases in the proportion of businesses using an Intranet are in the North West (up 15 percentage points) and the South East (up 9 percentage points).

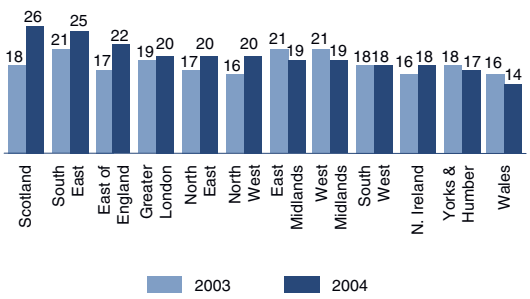
E-commerce has increased in all regions and most significantly in Scotland

Fig 10.3j Businesses trading online(1)



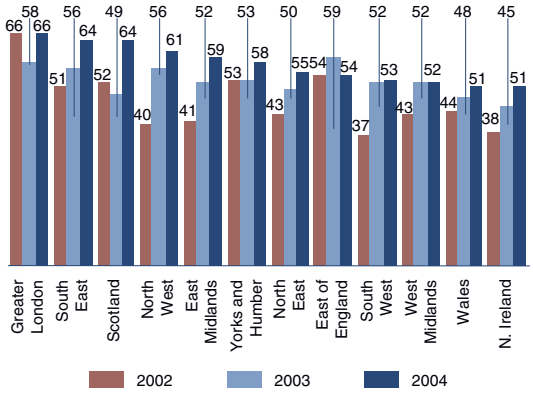
Question: "Trading online composite?"
Base: All businesses

Fig 10.3k Businesses that order online via an e-market place or exchange (%)



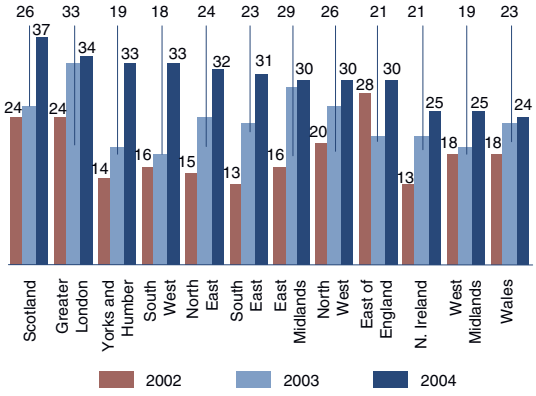
Question: "Does your business order online via an e-market place or exchange?"
Base: All businesses

Fig 10.3l Businesses that place orders online (%)



Question: "Does your business place orders online?"
Base: All businesses

Fig. 10.3m Businesses that pay for goods and services online (%)

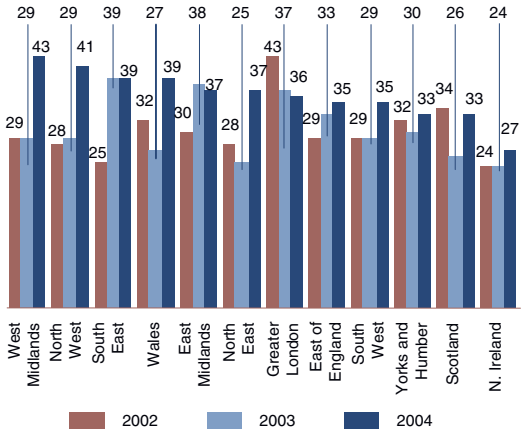


Question: "Does your business pay for goods and services online?"
Base: All businesses

Note (1): To be counted as trading online a business must fulfil the following function:
Online trading = f[(enabling customers to order online) AND (enabling customers to pay online OR pay for own goods/services online) OR (order own goods/services online) AND (enabling customers to pay online OR pay for own goods/services online)]

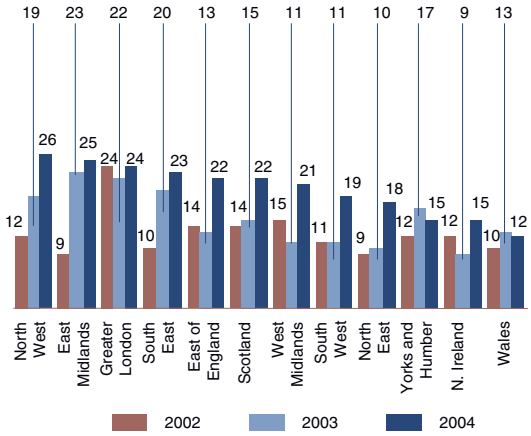
E-commerce has increased in all regions and most significantly in Scotland (cont'd)

Fig 10.3n Businesses that allow customers to order online (%)



Question: "Does your business allow customers to order online?"
Base: All businesses

Fig 10.3o Businesses that allow customers to pay online (%)



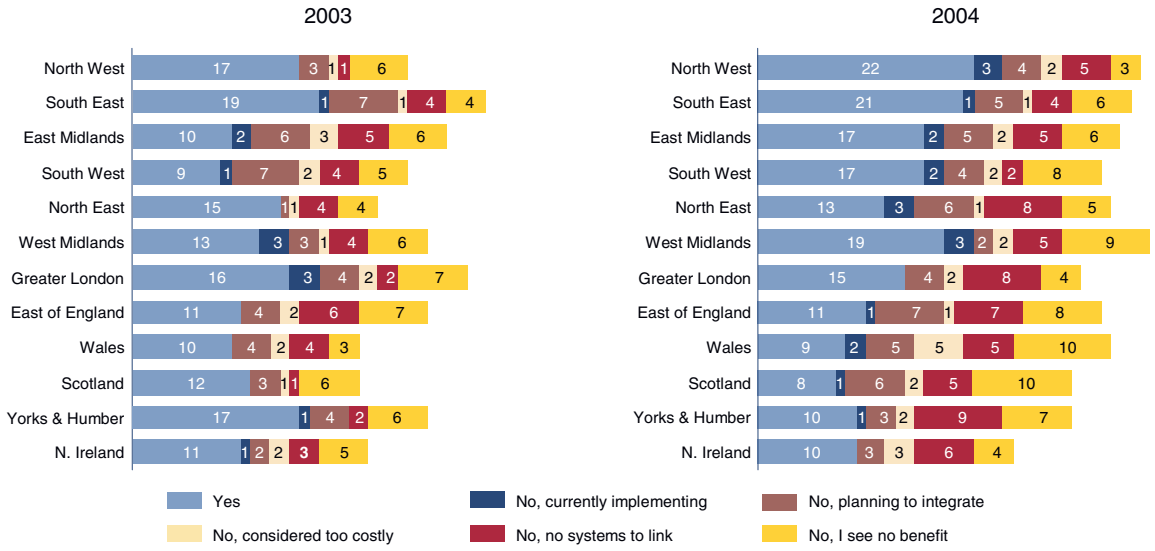
Question: "Does your business allow customers to pay online?"
Base: All businesses

- In general, participation in e-commerce has increased in all regions:
  - The proportion of businesses paying for goods and services online has increased by an average of 7 percentage points across all regions;
  - Nearly a third of businesses now pay for goods and services online.
- Scotland has shown the most significant increase in participation by businesses in e-commerce:
  - The proportion of businesses trading online has increased on average by 13 percentage points;
  - Similarly the proportion that place orders online has increased 15 percentage points;
  - The proportion of businesses that pay for goods and services online has increased 11 percentage points;
  - The increase in participation in e-commerce in Scotland is consistent with the results of The Scottish e-Business Survey (SEBS), conducted by Scottish Enterprise(1), which noted that "there has been an increase in the number of organisations accepting and making payments online".
- Businesses in the South West have also seen notable widespread improvements in their participation in e-commerce :
  - The proportion of businesses paying for goods and services online has jumped from 18% to 33%;
  - The proportion of businesses allowing customers to order online has increased from 29% to 35%, while the proportion of business allowing customers to pay online has increased from 11% to 19%.
- Other regions have seen an increase in the proportion of businesses allowing customers to order online:
  - Businesses in the West Midlands are the most likely, growing 14 percentage points, with 43% now allowing online purchases;
  - The proportion of businesses allowing online purchases grew by 12 percentage points in the North West and Wales.
- Online payments, both by and to businesses, have also increased in all regions, except for Wales and Yorkshire and Humberside, where the proportion of businesses allowing customers to pay online has remained stable.

(1) www.scottish-enterprise.com

Businesses in the North West still lead other regions in the linking of ordering systems to other internal systems

Fig 10.4a Businesses with an ordering system linked to other internal systems (%)



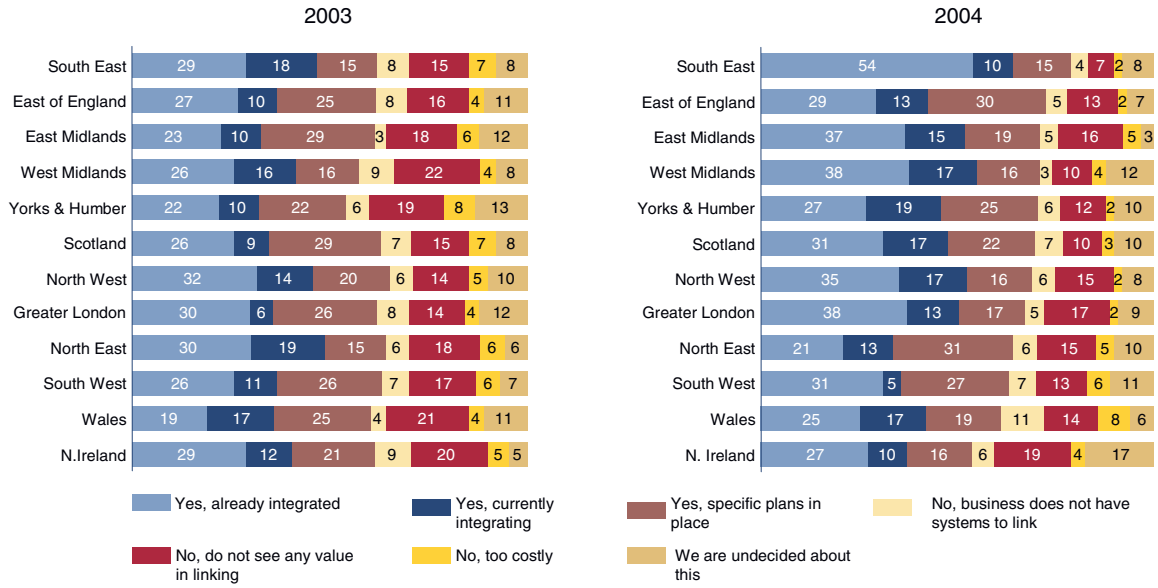
Question: "When you receive an order online, are other systems automatically updated?"
Base: All businesses

Between 8% and 22% of businesses have linked their ordering systems with another internal system

- The North West leads with 22% of businesses with an ordering system linked to other internal systems, followed closely by the South East at 21% of businesses.
- Three regions have shown significant improvement over the last year:
  - In the South West, 17% of businesses have an ordering system linked to other internal systems, up 8 percentage points since 2003;
  - In the East Midlands, the proportion of businesses with an ordering system linked to other internal systems has improved by 7 percentage points since 2003, from 10% to 17%;
  - Similarly, in the West Midlands, the proportion of businesses with an ordering system linked to other internal systems has increased from 13% to 19%.
- All other regions have remained stable, with the exception of notable declines in Yorkshire and Humber and Scotland:
  - The proportion of businesses with an ordering system linked to other internal systems in Yorkshire and Humber has declined from 17% to 10%, while the proportion of businesses in Scotland with similarly linked systems has moved from 12% to 8%.

The proportion of businesses with internal network technologies which also have integrated internal systems has increased in ten of twelve regions

Fig 10.4b Businesses with integrated internal systems (%)



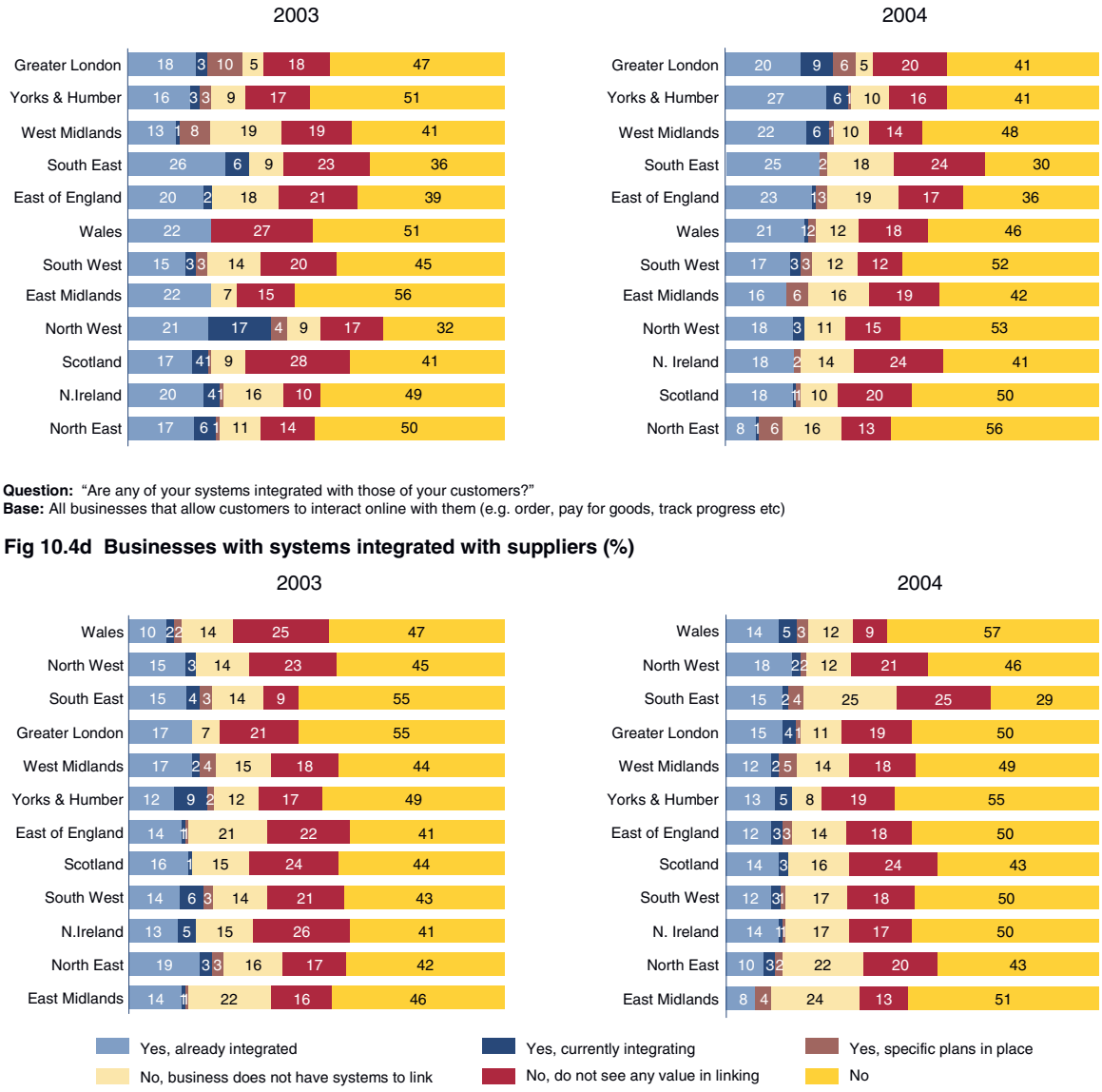
Question: "Do you intend to integrate your internal systems so that they are linked and can share information?"
Base: All business with LAN, WAN or Intranet

Between 21% and 54% of businesses with internal network technologies also have integrated internal systems

- The South East records the largest increase of businesses with a network which also have internals systems, with a rise from 29% to 54% from last year.
- Businesses in the East Midlands, the West Midlands and Greater London have also recorded significant increases of 14, 12 and 8 percentage points respectively
- Wales and Northern Ireland have the lowest proportion of businesses with internal network technologies which have also integrated their systems, or are doing so/planning to do so.
- The North East has the lowest proportion of businesses (21%) with both internal networks and integrated internal systems, though relatively large proportions of businesses are either currently integrating their internal systems (13%), or are planning to do so (31%).

Two of twelve regions have shown significant increases in the proportion of businesses with systems integrated with their customers

Fig 10.4c Businesses with systems integrated with customers (%)



Question: "Are any of your systems integrated with those of your customers?"
Base: All businesses that allow customers to interact online with them (e.g. order, pay for goods, track progress etc)

Fig 10.4d Businesses with systems integrated with suppliers (%)

Question: "Are any of your systems integrated with your suppliers?"
Base: All businesses that interact online with suppliers (e.g. order/pay for supplies, track orders)

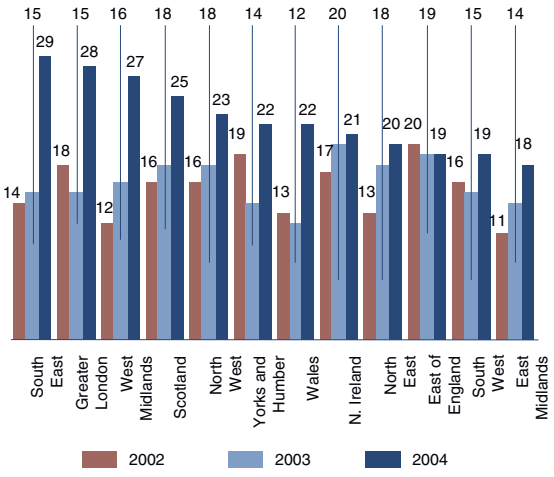
- Greater London leads in the proportion of businesses (35%) that allow customers to order online that also have integrated systems with their customers, or are planning to integrate.
- Yorkshire and Humberside and the West Midlands have shown the greatest improvement in the proportion of businesses which have both online sales and systems integrated with customers, with increases of 11 and 9 percentages points respectively.
- Of businesses which trade online and also have integrated systems with suppliers, there have been few notable increases, with the exception of businesses in Wales and the North West, which have recorded improvements of 4 and 3 percentages points respectively.
- Both the North East and the East Midlands have recorded declines in the proportion of businesses which trade online that either have systems integrated with customers, or have systems integrated with suppliers.

10.5 Perceived Impact

The proportional value of online orders for those businesses that order online has increased significantly over the last three years, while the change in online sales has been more variable

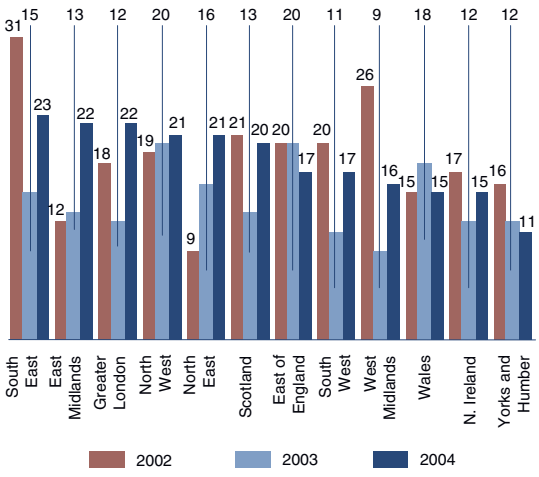
Businesses (with the facilities for e-commerce) order between 18%-29% of goods online and sell between 11%-23% of turnover this way

Fig 10.5a Online orders for businesses that order online (% of all orders value)



Question: "Roughly what percentage of the total value of the goods and services ordered by your business are made using online technologies?"
Base: All business placing orders online

Fig 10.5b Online sales for businesses that sell online (% of total sales value)



Question: "Can you tell me roughly what percentage of the value of sales are ordered using online technologies?"
Base: Businesses that allow customers to order online

- The average proportion of orders and sales made online by businesses participating in e-commerce has increased significantly, in contrast to the dramatic decline last year.
- Businesses with the facilities to order online bought between 18% (East Midlands) and 29% (South East) of goods and services online.
- The average percentage of sales made online by those businesses selling online in each region varies slightly more – on average between 11% (Yorkshire and Humberside) and 23% (South East).
- The greatest increase in the average proportion of sales and purchases (in value terms) made online by businesses participating in e-commerce occurred in the South East and Greater London.

Appendix 1: Glossary

Glossary

ADSL	Asymmetric Digital Subscriber Line – a technology that enables digital material to be sent down existing copper telephone lines and allocates the bulk of the total bandwidth used to downstream transmission from the central server to the consumer.
Bandwidth	Bandwidth (the width of a band of electromagnetic frequencies is used to mean (1) how fast data flows on a given transmission path, and (2), somewhat more technically, the width of the range of frequencies that an electronic signal occupies on a given transmission medium. Any digital or analogue signal has a bandwidth. It measures the maximum amount of data which can be carried at a given time by an Internet connection. A low bandwidth connection means the Internet connection will be slower. In digital systems, bandwidth is expressed as data speed in bits per second (bps).
Broadband	High-bandwidth Internet access. In general, broadband refers to telecommunication in which a wide band of frequencies is available to transmit information. Because a wide band of frequencies is available, information can be multiplexed and sent on many different frequencies or channels within the band concurrently, allowing more information to be transmitted in a given amount of time.
Cable modem	A cable modem is a device that enables you to connect your PC to a local cable TV line and receive data at about 1.5 Mbps. This data rate far exceeds that of the prevalent 28.8 and 56 Kbps telephone modems and the up to 128 Kbps of Integrated Services Digital Network (ISDN) and is about the data rate available to subscribers of Digital Subscriber Line (DSL) telephone service. A cable modem can be added to, or integrated with, a set-top box that provides your TV set with channels for Internet access.
Cookie	Information stored about a visitor to a website in the form of a text file on the visitor's machine.
Database	A means of storing data in an organised manner.
Desktop video conferencing	Allows users to communicate with voice and video over the Internet using their desktop computers, which must be equipped with video camera and microphone functionality, as well as the requisite software.
DSL	DSL (Digital Subscriber Line) is a technology for bringing high-bandwidth information to homes and small businesses over ordinary copper telephone lines. XDSL refers to different variations of DSL, such as ADSL, HDSL, and RADSL.

Glossary

DTI	UK Government's Department of Trade and Industry.
E-marketplaces/ exchanges	Online virtual markets that enable buyers and sellers to share information and order/pay online. For example, builders, contractors, distributors, wholesalers and manufacturers in the homebuilding industry buy materials and labour online using an e-marketplace.
Electronic Data Interchange (EDI)	Electronic Data Interchange (EDI) is a standard format for exchanging business data. An EDI message contains a string of data elements, each of which represents a single fact, such as a price, product model number, and so forth, separated by delimiter. The entire string is called a data segment. One or more data segments framed by a header and trailer form a transaction set, which is the EDI unit of transmission (equivalent to a message). A transaction set often consists of what would usually be contained in a typical business document or form. The parties who exchange EDI transmissions are referred to as trading partners.
Electronic mail (e-mail)	Electronic mail (e-mail) is exchange of computer-stored message by telecommunication. E-mail messages are usually encoded in ASCII text. However, you can also send non-text files, such as graphic images and sound files, as attachments sent in binary streams.
Extranet	An extranet is a private network that uses the Internet protocol and the public telecommunication system to share part of a business's information or operations securely with suppliers, vendors, partners, customers, or other businesses. An extranet can be viewed as part of an organisation's intranet that is extended to users outside the business.
ICT	Information and Communication Technology.
Interactive (automated) telephone system	This is a telephone facility that manages incoming calls and handles them based on the number called and associated handling instructions. Many businesses offering sales and service support use an automated telephone system to validate callers, make outgoing responses or calls, forward calls to the right party, allow callers to record messages, gather usage statistics, balance the use of phone lines, and provide other services.

Glossary

Intranet

- An intranet is a private network that is contained within an enterprise. It may consist of many interlinked Local Area Networks and also use leased lines in a Wide Area Network. Typically, an intranet includes connections through one or more gateway computers to the outside Internet. The main purpose of an intranet is to share organisation information and computing resources among employees. An intranet can also be used to facilitate working in groups and for teleconferences. An intranet uses Internet protocol.

ISDN

- ISDN (Integrated Service Digital Network) is digital transmission over ordinary telephone copper wire as well as over other media. ISDN is a telecommunications service that turns a copper phone line into a high speed digital link that can quickly transmit voice, data and video images simultaneously. ISDN requires adapters at both ends of the transmission so the access provided also needs and ISDN adapter. ISDN is generally available from the phone organisations in most urban areas in the USA and Europe.

Kbps

- Kilobits per second. Refers to speed of data transmission

Leased line

- A leased line is a telephone line typically supplied by the telephone organisation or transmission authority, that has been leased for private use as a dedicated circuit that permanently connects two or more user locations and is for the sole use of the subscriber. In some contexts, it is called a dedicated line. A leased line is usually contrasted with a switched line or dial-up line. Typically, large businesses rent leased lines to interconnect different geographic locations in their business. The alternative is to buy and maintain their own private lines or, increasingly, to use public switched lines with secure message protocols.

Local Area Network (LAN)

- A local area network (LAN) is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building). Usually, the server has applications and data storage that are shared in common by multiple computer users. A local area network may serve as few as two or three users (for example, in a home network) or as many as thousands of users (for example, in an FDDI (Fibre Distributed Data Interface) network).

Mbps

- Megabits per second. Refers to speed of data transmission

Glossary

Minitel

- First launched in 1982, the Minitel terminal consists of a small monitor with a keyboard connected to a phone jack. France Telecom distributed this computer-like device free with its normal telephone service. First used as an online yellow pages, Minitel grew at the expense of new alternatives such as the Internet, and at the start of 1999 the number of French Net users was half that of Britain's. In 2000 France had an estimated 18 million Minitel users, compared with fewer than 10 million on the Internet. Now, as the costs associated with Internet access are decreasing and Minitel applications remain limited, the Internet is becoming a much more attractive alternative.

Modem

- Modulator/Demodulator. The device that takes signals from a computer and translates them into a suitable form for the telephone system. The reverse procedure takes place at a modem on the host computer. It modulates outgoing digital signals from a computer or other digital device to analogue signals for a conventional copper twisted pair telephone line and demodulates the incoming analogue signal and converts it to a digital signal for the digital device.

Online

- Online is the condition of being connected to a network of computers or other devices. The term is frequently used to describe someone who is currently connected to the Internet.

ONS

- UK Office for National Statistics.

PC

- Personal computer.

PKI

- Public Key Infrastructure. A standardised system of encryption, enabling secure transactions by businesses, governments and individuals at low cost.

PSTN

- PSTN (public switched telephone network) is the world's collection of interconnected voice-oriented public telephone networks, both commercial and government-owned (also referred to as the Plain Old Telephone Service (POTS)). It is the aggregation of circuit-switching telephone networks that has evolved from the days of Alexander Graham Bell. Today, it is almost entirely digital in technology except for the final link from the central (local) telephone office to the user. In relation to the Internet, the PSTN actually furnishes much of the Internet's long-distance infrastructure.

Remote access

- The ability to gain access to a computer or network from a remote location, usually over the Internet.

Remote (mobile) terminals

- Remote terminals or computers use remote access to get access to a computer or a network from a remote distance. In corporations, people at branch offices, telecommuters, and people who are travelling may need access to the corporation's network. Dial-up connection through desktop, notebook, or handheld computer modem over regular telephone lines is a common method of remote access. Integrated Services Digital Network (ISDN) is a common method of remote access from branch offices since it combines dial-up with faster data rates. Wireless, cable modem, and Digital Subscriber Line (DSL) technologies offer other possibilities for remote access.

Satellite Internet connection

- A satellite Internet connection is an arrangement in which the upstream (outgoing) and the downstream (incoming) data are sent from, and arrive at, a computer through a satellite. Each subscriber's hardware includes a satellite dish antenna and a transceiver (transmitter/receiver) that operates in the microwave portion of the radio spectrum. Uplink speeds are nominally 50 to 150 Kbps for a subscriber using a single computer. The downlink occurs at speeds ranging from about 150 Kbps to more than 1200 Kbps, depending on factors such as Internet traffic, the capacity of the server, and the sizes of downloaded files.
- Satellite Internet systems are an excellent, although rather pricey, option for people in rural areas where Digital Subscriber Line (DSL) and cable modem connections are not available. The two-way satellite Internet option offers an always-on connection that bypasses the dial-up process. In this respect, the satellite system resembles a cable modem Internet connection. However, this asset can also be a liability, unless a firewall is used to protect the computer against hacking. Satellite systems are also prone to rain fade (degradation during heavy precipitation) and occasional brief periods of solar interference when the sun lines up with the satellite for a few minutes each day.

SME

- Small and Medium-sized Enterprise.

Spyware

- Stand-alone programs that can secretly monitor system activity. These may detect passwords or other confidential information and transmit them to another computer.

Trojan Horse

- A program that neither replicates nor copies itself, but causes damage or compromises the security of the computer. Often spread by e-mail.

Glossary

Video conferencing	A video conference is a live connection between people in separate locations for the purpose of communication, usually involving audio and often text as well as video. At its simplest, video conferencing provides transmission of static images and text between two locations. At its most sophisticated, it provides transmission of full-motion video images and high quality audio between multiple locations.
Virus	A program or code that infects another program, boot sector, partition sector, or document that supports macros, by inserting itself or attaching itself to that medium. Most viruses simply replicate themselves, though some also inflict large amount of damage onto infected computers.
Voice over IP	Facility to allow enable voice communication over a data network, by transmitting discrete digitised packets rather than the traditional circuit-committed protocols of the public switched telephone network (PSTN). VoIP calls can be made through an IP enabled switchboard, or through a desktop connected to the Internet.
Web, The	The (worldwide) Web is a system of pages composed of graphics, sound, text and user input linked together via the Internet. It is part of, but by no means the only part, of the Internet.
Website	A website is a related collection of worldwide web (www) files that includes an opening file called a home page. A business or an individual can tell you how to get to their website by giving you the address of their home page. From the home page, you can get to all the other pages on their site.
Wide Area Network (WAN)	A Wide Area Network (WAN) is a geographically dispersed telecommunications network. The term distinguishes a broader telecommunication structure from a Local Area Network. A Wide Area Network may be privately owned or rented, but the term usually connotes the inclusion of public (shared user) networks.
Wireless Internet Service Provided (WISP)	A Wireless Internet Service Provided (WISP) is an Internet Service Provided (ISP) that allows subscribers to connect to a server using medium-range wireless links. This type of ISP offers broadband service and allows subscriber computers, called stations, to access the Internet and the Web from anywhere within the zone of coverage provided by the server antenna. This is usually a region with a radius of several kilometres. Assets of WISP technology included flexibility (it is easy to add stations or move them) and broad bandwidth. In remote areas where neither cable nor DSL is available or practical, a WISP can provide good Internet service at reasonable cost, acting as an alternative to satellite Internet connections.

Glossary

Wireless LAN / WAN ▸ A wireless LAN or WAN is one in which a mobile user can connect to a Local Area Network (LAN) or Wide Area Network (WAN) through a wireless (radio) connection.

Worm ▸ A program that replicates itself, for example, from one disk drive to another, or by copying itself using e-mail or another transport mechanism. The worm may do damage and compromise the security of the computer. It may arrive in the form of a joke program or a software programme.

xDSL ▸ Generic term covering all variants of Digital Subscriber Line (DSL) technology. (see ADSL above)

Appendix 2: Additional Sources

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