



# government on the web

a report by the comptroller and auditor general

Ordered by the House of Commons to be  
printed 13 December 1999

# comparator A

**A.1** Commercial companies have been at the forefront of the hectic pace of change in Internet and Web use, so their current experience may provide the most useful available indicators of trends likely to hit the public sector over the next few years.

**A.2** We undertook a set of interviews with leading-edge private sector companies in the UK, to assess how far the development of Web-based computing had altered their business processes, internal organisation and patterns of relations with customers. The companies covered were:

- BT - a leading UK telecommunications company;
- Tesco - one of Britain's biggest supermarket chains;
- DHL - a major force in the private sector parcels and package-moving business;
- Dell - a major supplier of personal computers and computer accessories;
- The Financial Times group - an important media company;
- Glaxo-Wellcome - a key company in the pharmaceuticals industry;
- Barclays Bank - one of the 'big three' UK clearing banks;
- Citibank - a US bank providing its UK customers with telephone and on-line banking and;
- CISCO - the UK subsidiary of a major international IT software and hardware company.

We are very grateful to all the companies for their help in undertaking this project. Wherever feasible we name the companies whose practices we are referring to, but in a few cases we have anonymised the firms involved because the information covered is commercially sensitive.

**A.3** The point of these comparisons is specifically to draw lessons for the future from unusually forward-looking and 'advanced' companies, and not in any way to describe the current state of business practice on Web-based computing - which is anyway changing very rapidly. So these nine firms were



# Private Sector Firms and the Web

not chosen to be representative of all large companies, let alone of business as a whole. Instead we focused on companies which are already further along a pathway to electronically interacting with their customers and contractors, which already have a substantial Web presence and involvement, and which resemble central government in being large-scale employers. Four key lessons emerge covering:

- The experiences of firms in using their external Web sites to provide information for and develop electronic transactions with their customers.
- How firms use intranets and extranets in their internal business processes.
- How companies organise control over Web-based computing, control access to the external Web site and the company intranet, and manage the quality and development of both sectors.
- Firms' experience of developing a business case for investing in Web-based computing, the level of spend committed, and how they estimate the benefits of their Web site or intranet use.

## Using external Web sites - the experience of leading companies

**A.4** All the firms in our study emphasised the growth in customers' uses of the Web, the high level of uncertainty about customers' behaviour and future trends, and the rapid pace of technological changes in Web development in general. Developing their first Web site was still a recent experience, often forced through under intense time pressures to be first into the UK marketplace. For the international companies like Cisco, DHL and Dell, creating Web provision from scratch involving matching already well-developed practices begun in their United States parent companies, but adapted to European conditions (for example, by having multiple languages on the site). These companies mostly felt under intense competitive pressure to not fall behind rival firms in the styling, functionality or sophistication of their external sites. Some firms dealing directly with the mass consumer market - such as BT home provision, Tesco and Lloyds - stressed the extent to which the mass media and competitors now viewed their external Web

site as a key barometer of their awareness of market trends and their responsiveness to consumer demands. Failure to invest adequately in the Web site and to keep it up to speed with competitors would quickly attract adverse commentary, and have severe, indirect, reputational costs, as well as the site becoming less successful in attracting Web users directly. Other firms - such as Cisco, Dell, and BT business services - dealt mainly with sections of business which are already heavily Internet-orientated, where customer responses were finely tuned and highly demanding. Both customers and the trade press would be highly critical of any low functionality elements in their Web provision.

**A.5** All the firms stressed the very fast response times involved in maintaining an effective Web presence, and the near-instant come-back from Web users if things did not work as they were supposed to. But they also emphasised that the Web as a medium is well-adapted to a process of continuous organisational learning, making incremental improvements and seeing their effects on customers - for instance, putting up new Web pages or facilities and then taking them off again, if they are little used. Accurate and immediate feedback information is vital here, and most companies invest a good deal of time and resources in carefully tracking the use made of their external Web sites and analysing users' behaviour. Their Web teams are constantly devising new **fixes** and options to expand usage and encourage the retention of users in the site. DHL even provide a game in part of their site for customers to take 'time out'. Companies' information is not confined to the raw number of **hits** or accesses on a site, (which can be misleadingly inflated by Web pages composed of multiple elements, each of which registers as a separate hit when it is accessed.) Firms are chiefly interested in the number of **user sessions** or visits, that is discrete occasions when a user reaches their site, plus the number of **click-throughs** that they make when on-site, the number of **page accesses**, the length of time that users spend on site, and the extent to which site visits result in transactions - either completed on the site electronically, or often completed via phone calls.

**A.6** A widely recognised pattern of customer behaviour at present in the mass market is for customers to undertake product research via the Web - for instance, in Dell's case deciding what configuration of PC they want to buy.

Dell's rule of thumb before Web use took off was that it took an average of three phone calls to close the sale of a PC - one where the customer got a first quote, a second to get more information or to change the PC configuration, and a third to place the order. But most customers now access the company's Web site first. They design and cost their own PC configuration on screen (getting information on components' compatibility automatically), and then firm up and print off a definite order. It then takes them only a short call in to Dell to tie up the order. Dell calculate that for Internet sales, it takes an average of half a phone call to close a sale.

A wide range of consumer research suggests that people who access a company's Web site to research a large purchase are much more likely to 'close' a sale with the firm than otherwise similar people brought into contact with the company by other means, such as press or TV advertising, or phone sales. Well-designed Web sites seem to work here because customers can much more quickly and effectively focus on their own individual needs, interests or 'sticking points', without being hurried or directed by a salesperson. Customers can also make comparisons between different companies much more quickly and effectively on the Web, so that when they come to place an order they are more confident in the deal on offer.

**A.7** Mass market Web sites are still less developed than sites targeted on business-to-business markets, but they can offer companies radical opportunities for moving towards an electronic transactions paradigm. For example, BT are developing new Internet-based methods for tailoring marketing to the audience. In the future, if a customer enquires about or orders the BT **internet service provider (ISP)** service over the Web, the site will automatically ask if she also needs to consider purchasing a modem to connect to the ISP. And the site design can be variegated, so that the same information (say, about the uses of a pager) might be presented in radically different forms to a young person aged under 25 or to someone aged 65 or more. Similarly Tesco runs Tesco Net as an internet service provider, which enables them to advertise their own products to general Internet users.

Tesco own an Internet Service Provider (ISP), for which they initially made a monthly sign-up charge, but later operated as a free service. Tesco see the Internet as like a shopping mall. By running an ISP they get the front door and customers who log on ("walk" through the front door) see Tesco's name first. For products that Tesco do not sell, there are third party providers, such as Interflora. There are cost savings too. Without an ISP, Tesco would have to link their Web site to the 250 service providers there are in the UK.

**A.8** Web sites targeted on business and 'expert' users show the same pattern of facilitating research and specification of needs by customers. But they can also go a lot further in moving to fully electronic transactions, usually because the company deals over the Web only with registered account holders, who can develop long-term familiarity with their site. For example, DHL register customers as account holders on their Web site (after a time-lapse to check for duplicate accounts taken out by people who have forgotten their previous account number).

DHL's account holders can make bookings for parcel pickups and deliveries on the Web site. DHL's system automatically routes the booking to the nearest courier to the customer within five minutes of receipt, printing out a request with collection details, and giving the customer direct contact with the courier. Customers can then follow all stages of their order from the Web site, checking on the location of their parcel until it is delivered. DHL find that providing good tracking information is as important to customers as actually managing the shipping process effectively.

**A.9** Perhaps the most ambitious firm in dealing with business users is Cisco, which aims to achieve near instant processing of orders for electronics components via its Web site.

Cisco's UK customers go through a rigorous Cisco accreditation process to become 'business partners'. They can then file orders electronically from the Web site, are invoiced electronically, and can track the status of their order 24 hours a day via the site. After Cisco receive the order, and the payment process has been approved electronically, they move the order on to their suppliers and to a parcels company (Federal Express) which delivers their components direct to customers. The Cisco ideal is a **zero-touch process** in which the transaction is so automated that no company employee has to touch a keyboard in the order-filling chain. Cisco estimate that 45 per cent of their unit volume is directly shipped without a Cisco touch. An on-line customer care system allows any of their partners or their own staff to solve problems with Cisco applications. Trouble-shooting information and fixes or changes are posted on the Web site and can be downloaded by customers. This approach lets customers get straight on with fixing problems instead of calling the company helpline, getting rerouted and waiting for help. The company's customer-care ratings among its sophisticated client-base have improved since it moved onto the Web. In addition, more Cisco staff are now available on the helpline to handle a much smaller flow of non-routine problems, allowing the helpline staff to become more specialised in the most challenging and tricky issues.

**A.10** All the companies agree that putting up a Web site and expecting it to generate or attract business on its own is unlikely to attract significant traffic. In addition to being registered with all the major portal companies, Web sites need to be actively advertised and promoted. Whereas a couple of years ago a well-designed company site with favourable write-ups in the media or trade press might attract visitors because of its rarity value, now there will be hundreds of equivalent sites in all business sectors. Amazon.com, the premier internet bookseller, reportedly spend around \$10 million a month promoting their site, and companies we visited accepted that relaunches of their sites often needed significant spend on banner ads in major portals (up to £50,000 in one case), just as with press or TV campaigns. Co-listing sites on a reciprocal basis with other non-competing companies (such as suppliers or business partners) can also offer benefits. In addition, companies spend heavily on branding their Web site - for instance, putting its address on every piece of stationery, every business card, every leaflet and newspaper or magazine ad, and now even TV advertisements and poster campaigns. As one firm commented: "If the coffee cups said 'Dell' they would have the web site too."

**A.11** The most business-critical uses of Web sites relate to interaction with the company's legacy systems. On the one hand, the flexibility of the **TCP/IP** format means that Web-based systems can be made to sit on top of and interrogate legacy databases, using a custom-built interface, which takes the Web site far beyond mere brochureware. On the other hand, such interfaces may necessitate major modifications of existing systems, with far greater cost implications than the original development of the Web site. Product information derived from the company's stores database, for example, may have to be extensively translated for the customer, as stores systems may have extremely technical descriptions, with unintelligible abbreviations and different descriptions held in different parts of the system. The companies we visited vary a great deal in their current state-of-play in Web-enabling legacy systems. Undertaking a complete recasting of fundamental database systems has so far been a relatively rare response. The main effort has been to keep older systems running, but to make them capable of being partly interrogated by customers from the Web site or by people in the company beyond the narrow bounds of the section responsible for each kind of information. Most companies have fixes for linking legacy databases to their external Web sites, which they recognise have limitations and may not be sustainable in the longer term. One or two companies have been held back by the difficulties in achieving inter-linkages from developing new Web site applications and uses.

## How leading firms use intranets

**A.12** All the companies run intranets, with a wide variety of origin and use. Some companies, such as Dell, inherited their Intranet from the US parent company - so the current version in the UK was rather 'US-centric' when we visited but was quickly gaining company-wide acceptance. Other firms, such as Tesco and DHL, have intranets for their IT staff which they were considering expanding company-wide. BT however, have developed their intranet into a very extensive system, playing an integral and vital role in BT's business processes. All the companies started with the advantage of an established internal communications network that linked up their operations for simple e-mails and some data transfers. Adding a Web-based intranet gave critical additional facilities, which greatly increased usage in all the firms because people could now publish information and materials internally, making it available for any interested party within the organisation to access. Intranets can also handle many different kinds of files - including short video and audio clips; picture, photograph and graphics files; documents in many formats, including compressed formats for long documents; data files and spreadsheets; and software or applications. Intranet files are also searchable using Web-based search engines, some of which are very sophisticated, in addition to being indexed and site-mapped by the company's intranet managers.

**A.13** The most simple uses of the internal publishing function was to make available on a company-wide basis information for internal consumption that would otherwise have to be printed and periodically up-dated (usually with a time-lag). For instance, storing the full, company internal phone and e-mail directory on the intranet saves printing costs, allows the information to be kept constantly up to date, and provides the information in a computer-searchable form. Similarly company personnel departments use intranets extensively for publishing staff manuals, explaining pensions systems and entitlements, and advertising job vacancies. They also employ Web-based forms for submitting and processing private medical insurance claims, handling expenses claims, and so on. In the USA human relations (or personnel) applications have been one key motor for intranets' expansion. Intranets can also be set up to republish material entered on the company's external site, such as company press releases and marketing announcements, often in more extended forms or with additional materials - such as press criticisms of the company as well as its own PR outputs. Internal forecasts, company documents setting out business trends and priorities and constantly updated pricing schedules are all natural materials for intranet publication. For example, in a fast-moving field (where prices and specifications can change rapidly) allowing phone sales personnel or field sales personnel equipped with a portable PC and modem to download the most up-to-date prices for each new customer on a daily basis is an important advance in remaining competitive, compared with even weekly or bi-weekly price updates.

**A.14** As with external Web sites, some useful applications rely on the company's intranet interacting with legacy systems. For example, information on sales levels and trends can be made available on the intranet for all units that need it in a form that automatically updates as new orders flow in and are processed by the legacy systems. Some companies, especially those dealing with business-to-business sales, saw a progressive blurring of distinctions between their intranets and their external sites in business critical areas. For instance, in DHL or Cisco the order tracking systems essentially make the same information available directly to customers on the Web site which is used by internal managers on the intranet for maintaining control of the sales and delivery process. At Dell, internal users access the intranet via the external Web site, although technically it is a 'true' intranet which can only be accessed from inside the **Local Area Network (LAN)**.

**A.15** Convergence pressures are also strongly apparent in companies' use of extranets to link their computer systems directly with those of suppliers. Large companies have typically been linked for many years with their long-term suppliers or business partners via **Electronic Data Interchange (EDI)** systems. The information exchanges accomplished, however, have generally been very delimited in advance, and confined to handling the same fixed kinds of information carried by companies' internal communication and file-transfer systems before intranets arrived. In some of the companies we visited extranets have developed rapidly. Tesco provides a (charged) extranet for its suppliers giving them information on product turnovers at Tesco stores, which is an extension of its previous EDI relationships. The more fully and flexibly and earlier its suppliers can be positioned to meet market trends, the better it is for Tesco. And for the suppliers too there are considerable advantages in knowing the detailed movements of micro-markets in which they compete. Cisco allow their suppliers to connect electronically to their internal systems with secure password access, using an application written by Cisco, in a so-called **virtual extranet**. Suppliers can then identify market trends through analysis of their accounts with Cisco over a significant time period, while the security mechanisms guarantee that they cannot interrogate commercially sensitive information on the accounts of other suppliers.

## Corporations' approach to managing Web sites and intranets

**A.16** Corporations with developed Web-based computing systems acknowledge that the change has important implications for their internal organisation. One fundamental question is which section of the company should have responsibility for setting company policy and exerting management control over Web pages on the external site and over the intranet.

There are several possible contenders for being assigned responsibilities here:

- the existing IT or information services (IS) division, on the grounds that the Web and intranet involve computer hardware, new forms of software and specialist skills;
- the advertising or marketing or public relations divisions, on the grounds that the external Web site in particular is an extension of the company's work in these divisions;
- a central section acting on behalf of the divisions providing content for the Web pages, on the grounds that only senior content-providers know how they want to position the company's Web effort against its overall strategy;
- a specially created 'new media' directorate, set up as recognition that the development of the Web and intranets has already become a distinct professional specialism in its own right.

Most of the companies visited argued that assigning Web issues to be controlled by an IT or IS division would produce conservative and unadventurous management, since such divisions are pre-occupied with security and integration with other systems, and anyway have a cultural jump to make in appreciating the significance and *modus operandi* of the Web.

**A.17** However companies choose to control their Web site and intranets, they generally rely extensively on contractors to actually design the external site and to provide the infrastructure for the intranet. Web site development is an especially difficult area for companies to attract talented staff in-house, although that is what most would prefer to do in the near future. Most firms contract directly with a Web site specialist company for an initial design. Our interviewees observed that most such companies are experts in either the technology side or the advertising side of Web site design and it is difficult to find the two specialisms in one company. DHL use two companies, an advertising company which specialises in Web site design as their lead contractor, with a secondary contractor specialising in web-based technology. Sub-contracting Web design to the main IT contractor providing computer support and ISP services is thought less useful in many firms, because in the current high-demand market conditions for Web designers the main IT contractor will only sub-contract on the work to a specialist firm anyway. Having a Web site which is designed outside the company can create problems in subsequently altering pages or updating information, if all changes have to be implemented by the design firm - a main reason why companies are trying to develop their own in-house capabilities. Some companies have been able to get simpler updating signed off in-house, but still need the design firm to put through more radical modifications

to ensure that the overall design or integrity of the external Web site is not compromised. Companies use rules of thumb which take account of the need for maintaining and updating their Web sites - for instance suggesting that whatever amount of money is spent on the initial Web site design, the same amount should be assigned for updating and maintenance in the period up to the next major redesign.

**A.18** Nearly all the companies we visited adopt a very strict approach to what goes onto their external Web sites, insisting that all content should be rigorously viewed as marketing tools and designed with sales value-added and consumer priorities in mind. Occasional problems arise when elite or 'politically' powerful sections of the top management see the site as a repository for information which they value highly, such as the company's annual report or the directors' photographs and biographies. The divisions controlling the Web site need to have sufficient influence to be able to insist that material that most Web users will find pointless or off-putting should be kept out of the site, or at best included well away from the site's front page (for instance, five clicks deep in the site structure). New pages or sections of the Web site have to meet very strictly enforced design rules, to ensure that pages have a consistent corporate 'look and feel' and operate in recognisably similar ways to the rest of the site. Achieving a distinctive branding of the site which does not change between major upgrades is a key objective. The use made of pages and sections is rigorously monitored by the section controlling the Web sites on a daily or at worst weekly basis, and sections or pages that are poorly used are quickly taken off.

**A.19** Corporations adopt a more relaxed approach to the development of their intranets, with a view to encouraging their staff to make maximum use of this facility. Some of the big firms 'license' internal users before they are allowed to put Web pages on the intranet, giving them basic training in designing HTML pages and how to organise their part of the intranet, or make content providers sign some form of 'contract' in which they promise to keep up to date any pages or other information that they put on. Content management systems, such as that developed by Dell in Europe will mean that licence holders will not have to learn how to code HTML: this policy is likely to increase take-up but the system will still make it easier to standardise the presentation of content. Content-providers must also undertake that the information given is completely accurate and reliable, since other people in the company will use it in making decisions or planning their own strategies, without further consultation with the content originators. Some companies recognise that management of their now large and sprawling intranets could get out of hand. BT licenses users of its intranet and applies strong control procedures.

**BT assigns each Web page on its intranet a limited life when it is first put up, giving users a 'sell by' date after which the information provided is no longer valid. The content-**

**provider must renew or update their page by this date. Automatic software searches for and removes any page where this step has not been done, replacing it with a notice giving the page author's name and e-mail address and that of their line manager. It also sends the page owners an e-mail telling them what page is problematic and what has been done. In addition, accesses to sections of the intranet are monitored and information is regularly fed back to content providers so that they know how much their pages are being accessed. BT's position is that an effective intranet must be organic, with pages being added and removed constantly. Otherwise the intranet will simply get bigger year-on-year, with large desert areas of effectively dead pages growing up, cluttering up search engines and slowing response times. More importantly, users of such an 'overgrown' intranet would no longer have confidence that the information that they access is uniformly reliable and up-to-date, thereby detracting from its fundamental usefulness to the corporation as a whole.**

**A.20** All the companies stressed that the development of Web sites, intranets and extranets creates novel management and control problems. Making content-providers take effective ownership of their intranet or Web pages is an important example. Unless careful procedures are developed, staff may tend to prioritise queries they receive via traditional communication methods over web-generated queries. Another example is the emergence of important **version control problems** when content is provided in different forms - such as press or magazine advertising, marketing leaflets, and over the Web. Companies tend to have strong mechanisms already to ensure that information updating does not get out of sequence in marketing materials using different media. But version control problems can also grow strongly with intranets if documents or information are also published in paper formats. Companies with whole-firm intranets now make the intranet version the authoritative one to try and control this risk, and to make available the most up-to-date information for staff. Over time company intranets may also 'host' a wide range of specialist networks, e-mail rings and electronic conferencing by specialist subgroups handling issues too immediately specific or private to be worth publishing pages on the formal intranet - a phenomenon called the **under-Web** in some contexts. Again companies see it as important to have clear policies to minimise the emergence of an under-Web.

## How firms assess the business case for investing in Web - based computing

**A.21** In the rapidly changing conditions of the Web all the companies we visited were clear that making a conventional business case for investing in the Web or company intranets was extremely difficult for a number of reasons. Those companies which are not yet adapted to processing large-scale

electronic transactions are still in the process of developing measures of the business value of their external Web sites. Many of the gains from the Web site are relatively intangible, such as a better market reputation; an ability for consumers to undertake better research before committing to their products; and improved customer-care perceptions. Web investments are also often driven by the need to respond to competitive pressures from rival firms investing in their Web presence.

**A.22** A key factor for companies like Cisco, Dell, BT and Tesco in estimating the business case for Web developments concerns the potential for costs to be displaced from some other channel of contact between the company and consumers. Companies estimate quite high costs to them of simply answering customer queries over the phone even in call centres, let alone using phone-selling techniques to expand their markets or providing company helplines. This information is often rather rough and ready, and is always commercially sensitive. But rules of thumb quoted by different firms included:

- an average cost of £3 per phone enquiry;
- a cost of £1 per minute for a call centre enquiry;
- a cost per phone call in the USA of \$6 each; and
- an average cost of £2 for each manual tracking or pricing/tariff enquiry handled by phone.

If customers can be persuaded to use the company's Web site (for instance to do research or seek basic information) instead of contacting company personnel over the phone then the whole of the estimated cost of a phone access can be saved, because the marginal cost of an extra Web access is effectively zero. Multiplied across thousands of accesses the savings from displacing customers onto the Web can quickly mount up to very substantial figures. So long as patterns of Web use continue to firm up, and other channels (such as phone contacts) decline, then these cost savings are potentially recurring. For 1998, Cisco estimated cost savings of \$550 million from five main Web applications, out of a total company cost base of \$2,500 million in that year. Companies with a great deal of direct mail contacts with customers can make similar savings to those on phone enquiries, especially if customers can be persuaded to use the Web instead of originating a great deal of inward white mail which is expensive to handle.

**A.23** For companies with substantial contacts with customers via a dedicated sales force, franchised outlets or intermediary agents, the potential cost savings in encouraging customers onto the Web are even more substantial. However, these firms also often confront substantial **channel rivalry** difficulties and risks, which still extensively impede the use made of Web-based marketing. The risk is that by attempting to develop direct Web-based contacts between customers and the company, cutting out the sales force or the middle man, the

company might erode the morale or effectiveness of its major existing links to customers. If the established links to customers are provided by intermediaries (for instance, retailers, agents or franchisees) the company may lose ground through stimulating defections of intermediaries to rival companies. By contrast if the established links to customers are the company's own salaried staff organised in a sales force or a system of front offices, the risks of channel rivalry leading to market share losses in a transition to Web-based customer contacts can be substantially reduced or eliminated.

**A.24** Accesses to a company's web site also have a positive commercial value for it in terms of advertising and generating 'good will', bringing the company to customers' attention and developing its brand name and identity. Some firms attempt to factor in a cash benefit for this new media exposure, and then include it their calculations of the business case for their Web site. Each site access by a user is valued at a basic amount, and substantial click-throughs or time spent in the site at a higher amount.

**A.25** Most companies we visited found substantial company-wide intranets hard to cost-justify and several firms took the position that estimating the business benefits of their intranets was unlikely to be feasible or helpful. Other companies interviewed assigned very substantial sums to the business process benefits, which cost-justified the relatively modest IT investments involved by a high factor. For instance, one very large company spent £20 million on its intranet in a recent year and estimated annual business benefits of £160 million, not just cost savings but also largely positive benefits not otherwise achievable. The main limitations on business benefits were reported in companies where putting pages up on the intranet was seen as a difficult process with longer timelines, and others where concerns over protecting intellectual property rights or maintaining internal commercial security limited content-providers' willingness to put materials onto the company intranet.