

ICT INPUT CRITICAL IN DRIVE FOR GREENER ECONOMY

The ICT industry has poor green credentials. But, argues Colin Smith, chief executive of software company BIW Technologies, this position can be reversed if companies take a more integrated and thoughtful approach to their ICT provision.

As companies from every sector of the economy look for ways to lessen their carbon footprint they often neglect one major part of their business operations that has the potential to significantly minimise their impact on the environment: information and communications technology (ICT). By using their existing ICT infrastructure more intelligently, adopting new applications and embracing innovations such as Software-as-a-Service (SaaS), an increasingly popular software delivery model, where customers do not pay for the software but rather for using it over the internet, companies can make a significant contribution to a much-needed greening of the UK economy.

Historically, ICT has poor green credentials. Production of ICT hardware places high demands on energy and natural resources (a UN study found that manufacturing a PC consumes 10 times the machine's weight in fossil fuels and chemicals). Operation of ICT hardware consumes high levels of energy – at remote data-centres, in-house data centres, in offices and at home. Indeed, this year represents a watershed as, for the first time, the cost of the energy required to power ICT equipment will surpass the cost of the computer kit itself.

In the UK there are approximately 10 million work PCs currently in active service. Research conducted by the National Energy Foundation estimates that of these, around 1.7 million are routinely left running when not in use. For the UK business community, this equates to around 1.5 billion kilowatt of electricity wasted every year, carrying a price tag of £115 million.

Much hardware and software is over-specified and under-utilised, with manufacturers often encouraging premature obsolescence. Disposal of ICT hardware can be highly polluting (UK companies dispose of around 1.5 million PCs, equal to 125,000 tonnes of ICT equipment, in landfill sites every year).

ICT can also create 'information overload', reducing individual productivity and efficiency. Poor software interoperability inhibits re-use of data, generating considerable re-keying and re-checking of duplicate information, duplication of software, expense of data translators, etc. However, despite these negatives, ICT also offers companies great opportunities to green their operations.

Process improvements, such as the greater re-use of information and better knowledge management - for example, the wider and more sophisticated use of extranets, intranets and wiki technologies - can reduce environmental impacts. Even bigger savings can come from designing buildings for sustainability; technologies such as building information modelling (BIM) can improve how projects are designed with full recognition of their carbon footprint before, during and after construction. Also, rationalising and centralising some ICT hardware and software, by using a SaaS approach, can dramatically reduce in-house ICT hosting and infrastructure costs.

Not paperless, but less paper

More efficient process management and greater re-use of information can have one much-needed benefit: it can reduce paper consumption, storage and transportation. The supposedly paperless office of the 21st Century has never really arrived and paper is a clear environmental enemy.

For example, adoption in the building and construction sector, collaboration technologies, such as sophisticated extranets, has reduced the amount of paper produced and disseminated within project teams. Electronic publication and dissemination does not eliminate paper altogether; some items will still be printed out – but around 60 per cent will not. So far as the BIW user community alone in this sector is concerned, this equates to a paper saving of around 16 million drawings and 9 million other documents – equivalent to a pile of paper 4.3km high, weighing 1700 tonnes. Rain forests around the world are probably sighing with relief.

Reduced production of paper-based documents can also lead to reductions in the requirement for hardware, consumables, personnel and other associated overheads:

- Fewer plotters, printers, photocopiers, scanners, faxes, etc
- Lower overheads - being less heavily-used they break-down less frequently
- Reduced energy consumption
- Reduced consumption of consumables, ie: ink, toner, fewer filing cabinets, suspending files, archive boxes, etc
- Lower 'warehousing' requirements - for example, on one traditionally-managed project, an airport operator collated enough paper to fill an entire Portakabin full of filing cabinets
- Reduced personnel – producing less paper can help lower manpower requirements, with a corresponding environmental benefit in terms of building-related costs



Looking at the expenses associated with processing and distribution of project paperwork, substantial quantifiable transport and manpower savings can also be achieved. For example, looking again at the BIW user community, we estimate distribution savings in excess of 400,000 litres of fuel and more than 2000 tonnes of CO2 emissions. And with the average worker spending 30-120 minutes searching for documents each day, even a 50 per cent efficiency improvement can yield immediate productivity improvements and thus overhead reductions.

Many firms have invested in intranets to manage communications and both general and specialist knowledge within their organisations: Arup, for example, has created numerous 'communities of practice' within the firm, where a combination of face-to-face and 'virtual' meetings – facilitated by the company's intranet - are used to develop the firm's intellectual capital in a wide variety of specialisms. Similarly, Bovis Lend Lease has 'ikonnect', a web-enabled information-sharing service that provides staff with quick and direct access to the best available knowledge anywhere in the company.

Wiki technologies also have potential. For example, architects Fielden Clegg Bradley and Edward Cullinan Associates have both deployed intranet-based wikis to manage knowledge within their practice, allowing authorized users to add, edit and update information at any time via a standard web-browser.

As I've already mentioned, the explosion of electronic communication and the proliferation of web-based information sources can create 'information overload', reducing individual productivity and efficiency.

Yet, tools exist to help users find key information more quickly or be automatically notified when new information relevant to their interests appears on the web, for example:

- Sophisticated desktop search applications help users find information quickly on their PCs
- Most intranets and extranets incorporate powerful content search engines
- 'Feed readers' deliver targeted content from RSS ("Really Simple Syndication") 'feeds' of updated content such as blog entries, news headlines or podcasts

Building for sustainability

Designing for sustainability is probably most important in the engineering, architectural and construction sectors. For example, BIM applications are increasingly being used during design to provide architects, engineers and designers with feedback about the impact of their design decisions on the BREEAM or EcoHomes ratings of projects. Such tools allow design teams to continually assess the sustainability performance of their proposed designs.

They also have an increasingly sophisticated array of tools at their disposal to help them design new built assets more efficiently. These tools can often also be deployed to:

- Support more sustainable planning, design and construction, provide 'carbon calculators', albeit too often focused on the asset – its materials and its energy performance - rather than the

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processes employed by the designers, contractors and suppliers involved in its construction

- Manage site waste management and other environmental protection initiatives, capturing quantitative data that can be used for regulatory reporting purposes and to meet corporate and social responsibility obligations
- Consult and keep employees, local residents and other stakeholders informed about planning and design issues, so that their inputs can be reflected in the eventual finished project
- Reduce the carbon footprint associated with operation and maintenance throughout its working life
- Recycle materials following demolition/dismantling of the asset.

More generally throughout a broad range of sectors, new applications and technologies are emerging that have the potential to revolutionise industry still further over the next decade and beyond, including:

- Online meeting tools (eg: Microsoft LiveMeeting, WebEx) – perhaps used in parallel with telephone calls (Webex has conference calling built in), and/or in combination with webcams or video-conferencing – can help to eradicate travel time and cut costs
- Web2.0 social applications (eg 'virtual' worlds such as Second Life are already being explored by some architects as a way to show client 'avatars' around design concepts)
- Mashups – online services typically created by combining data from two or more data sources (eg: linking real-time traffic data with Google Maps).
- Using RFID (radio-frequency identification) tags to help gather in-service data from assets providing a whole-life cost per m² or similar metrics

Using electronic tools can lead to dramatic increases in personal productivity, partly arising from the automation of some previously laborious or routine clerical processes – automating document distribution and approvals, creation and management of change orders, and other forms via extranets, for example, or faster searches for information via extranets, intranets, the web, etc. Moreover, the automation of repetitive clerical tasks has resulted in an improved quality of work for some staff.

SaaS-tainability

Probably core to the attempt to reduce the overall carbon footprint of IT hardware and software is SaaS. It is one of the most exciting and

fastest-growing parts of the software sector. Analyst firm Forrester Research said that adoption of SaaS increased by a third last year in large companies, while specialist investment bank Triple Tree recently said that SaaS "has grown beyond a mega-trend to cause major disruption to the status quo in the software industry."

SaaS is the term used to cover software applications (and associated data) that do not reside on the user's own computer or network, but are hosted remotely by the software vendor and are accessed via a standard web-browser. Externally-hosted, web-based solutions mean no (or low) in-house IT hosting, support and storage requirements – widespread use of SaaS applications could dramatically reduce the scale of in-house ICT resources, with a corresponding reduction in hardware, personnel, energy use and other overheads.

The SaaS approach concentrates all the hardware and software in facilities that makes optimum use of energy to power the hardware, provide cooling, etc - "economies of scale". Thus, while such server-farm facilities are demanding in their use of power, they will consume less energy than customers trying to maintain their own separate ICT infrastructures.

It is also worth considering the potential impact of web-delivered applications and data on what type of devices are used by end-users. With software and associated data sitting 'in the cloud' (ie: hosted on a remote server and accessed via the internet), there is less requirement for users to have large numbers of applications and related files sitting on their hard-drives. Assuming the availability and capacity of broadband connections – especially wireless (3G, GPRS, WiMax) - continues to grow, then users may start to employ simpler, smaller, lighter and more portable devices requiring less power, less maintenance and which become obsolete less quickly. Moreover, such simpler devices are also more likely to be available for home users – making regular home-working more economically viable.

Sustainability is the major challenge facing not only UK industry, but companies and economies internationally. ICT has a key role to play. Electronic construction collaboration systems and other ICT tools have already begun to deliver quantifiable benefits and emerging and future ICT developments have the potential to extend these benefits still further. In the drive for a greener global economy, the contribution of ICT should not be underestimated. ■