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Getting by, not getting on Technology in UK workplaces

Contents

pg 1	Foreword	<i>Susan Conway, Microsoft plc and director of IWPC</i>	CHAPTER 6//pgs 46-53	How does it feel? Attitudes and culture	<i>It's how I feel Technology = work Personalising and domesticating Groupthink Status and hierarchy Summary</i>
pgs 2-6	Executive summary				
pgs 7-8	Introduction		CHAPTER 7//pgs 54-62	On the top floor: management and strategy	<i>Networked enterprises Control and surveillance Do we have the technology? Resistance Summary</i>
CHAPTER 1//pgs 9-10	Background and report structure				
CHAPTER 2//pgs 11-20	Technology all around us: key trends	<i>Computer use and computerisation Management and work organisation The labour market Summary</i>	CHAPTER 8//pgs 63-69	With a little help from my colleagues: learning and change	<i>Management attitudes Learning about technology Implementing change Communication breakdown Summary</i>
CHAPTER 3//pgs 21-29	Ecology of the firm	<i>Does ICT matter? Push or pull? Technology, productivity and performance Organisational learning A model of the firm Technology and the firm</i>	CHAPTER 9//pgs 70-76	'The people downstairs': IT staff and ICT industry	<i>Technology and us With friends like these ... Selling Summary</i>
CHAPTER 4//pgs 30-35	Methods and sample	<i>Methods Places and people</i>	CHAPTER 10//pgs 77-81	Summing up: low tech equilibrium:	<i>The untidy truth Low tech equilibrium The limits of strategy Do you really want to delete?</i>
CHAPTER 5 // pgs 36-45	Saving labour or new labour? Tasks and tools	<i>Paper and PCs: Information, technology and knowledge Getting through: communication management Summary</i>	pgs 82-84	Conclusion	
			pgs 85-88	Recommendations	<i>Organisations Technology industry Government</i>
			pgs 89-91	Endnotes	

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Foreword – Susan Conway

The IT industry, in both Britain and America, has suffered lately as skeptics questioned the long-term impact of investment in technology. But a new transatlantic consensus, rooted in high-quality research, is emerging around the true impact that our products can have on organizational performance. Today we, as an industry, must articulate a better understanding of why the skeptics are mistaken. We are beginning to do so. And this report makes a significant contribution to the debate.

The Information Worker Productivity Council was formed last year to help build this new understanding. We are a joint research program bringing together academic institutions, technology industry leaders (including Microsoft), and technology consumers. We will produce distinctive and innovative practice models to improve the use of new technologies in organizations that we find enhance or enable information worker productivity. Information work stems from a unique asset set. It is not only limitless in its renewability but it is jointly owned by the organization and the worker. Information work employs both explicit knowledge stores (wells of

known information owned by the organization) and the tacit knowing capability of the worker to translate it into action. Information work - now visible in almost all walks of life, from call centre representatives to truck drivers and factory workers - is now at the core of organizational success.

Our agenda, and our forthcoming research, gels with this report. Like the authors we are optimistic about the transformative effect that information technology can have on workplaces, business productivity, and quality of working life. But we realize, as this report makes clear, that these changes do not happen by magic. They occur when

businesses invest wisely in technology and service enablers that work together to promote efficiency and profitability. Companies that learn to target, align and organize information to their strategies and information work will succeed in this new environment.

But we also know that, at present, things must be improved. Taking to heart the analysis and recommendation contained in these pages will help businesses in both of our countries to make the best use of technology in their workplaces. It should be read widely. ■



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EXECUTIVE SUMMARY

Executive summary

Background

1. The potential of information and communication technology (ICT) to transform the world of work is enormous. **But in the UK, technology's potential to transform work is often unfulfilled.** This report sets out to explain why. Drawing on grass-roots research conducted at the 'coal face' of the workplace, the principal conclusion is that **many UK workplaces are characterised by a 'low tech equilibrium'. They are still grappling with promise and reality of new technology. They are getting by, not getting on.** The powerful tool of ICT is being blunted by unrealistic expectations, organisational inertia and a failure of leadership.

Technology all around us

2. ICT is everywhere. Three out of four employees use a computer or other ICT at work; **seven out of ten believe using a computer is important or essential for their job.** And new technologies are facilitating the rapid transfer of information between people – **the 'I' and the 'C' of ICT are merging.**

3. Despite this near-ubiquity of ICT, **the organisation, management and style of work have undergone modest changes.** For all the rhetoric of a 'network economy' only a third of British organisations have outsourced significant functions or formed strategic alliances or networks with others.

The promised increases in worker autonomy have yet, for most, to materialise: indeed there is some evidence of reduced employee discretion and increased management control.

4. There is little to suggest that ICT has had much impact on working hours, in either direction. **But technology does seem to have increased work intensity: people may not be working longer, but they are working harder.** More people are using ICT to work from home: but most of these are occasional rather than permanent teleworkers. **And technology has clearly driven up both demand for and acquisition of skills:** nine out of ten new jobs now require ICT skills.

5. **The labour market has proved mostly impervious to the influence of ICT.**

'Free agents' or 'portfolio workers' remain a small minority. Employment with an organisation remains the rule. **But there are signs that job search and selection is undergoing significant change.** Three out of four workers have looked for a job online: more than nine million vacancies are web-posted annually.

6. **And the economic effects of ICT remain uncertain.** ICT may account for as much as half the growth in UK labour productivity over the last decade – but the impact on whole-economy growth has yet to be felt. This is partly a matter of timing. US productivity growth fell during the period of most intensive investment in ICT (1973-1990) but rose

sharply through the 1990s. Investment in ICT seems to be a slow-burn, at least at whole-economy level. **Given that UK firms invested less, later than their US counterparts, the country is almost certainly experiencing a 'productivity lag'.**

7. What explains this? There are a number of possible answers. **The strength of the pound has hurt UK manufacturing in recent years.** There may be **limited network benefits from ICT,** simply because there are not enough organisations using key new technologies. **Flexible US labour markets and enterprise culture** may have something to do with it. But most explanations centre on what goes on inside firms. **UK workplaces, their managers and employees hold the answers to the productivity puzzle.**

Does technology matter?

8. **Following the dotcom boom and bomb, senior corporate attitudes to ICT have swung in the pessimistic, or at least sceptical, direction.** Nicholas Carr's notorious article 'IT Doesn't Matter' argues that the chances of ICT-based competitive advantage are dwindling, as technology becomes a standard part of organisational life. **A cloud of techno-scepticism has settled over many British boardrooms. ■**

Executive summary

9. While technology can influence people, the reverse influence is just as strong. **What organisations do – or fail to do – with technology is a more important predictor of success than any technical specification.** The ‘productivity paradox’ illuminates this point. Research suggests that investment in ICT has modest returns in the first year, comparable to most capital expenditure: over a 5-7 year timeframe, however, the return can increase five-fold. But – and it is a big but – these returns depend on time-consuming organisational changes. Firms that simply install new technology will see a dismal return. **It is the indirect contribution of ICT that is significant – which comes only when technology is coupled with other organisational changes.**

10. Getting the best out of ICT therefore requires an understanding of how it fits into **the ecology of the organisation** – its attitudes, culture, rituals, structure, networks, processes and behaviour. **Simply dropping ICT into an organisation is unlikely to pay many dividends. It has to be embedded.**

Looking in the right place

11. **Understanding ICT in this context demands research strategies that get to the heart of the matter.** Large-scale, quantitative surveys yield some vital clues. But **it is vital to discover not**

only what people say they do with technology, but what they actually do.

In this research, periods of observation and interviews with individuals in eight case study organisations – covering a range of sizes, sectors and ownership – are combined with the insights of leading thinkers on the impact of ICT.

Saving labour or new labour?

12. The two areas in which ICT might be expected to have brought about most change are in the management of information, and the nature of communication. Our research shows that **while technology-based approaches are supplementing rather than supplanting old-fashioned approaches – piles of paper and chats in the corridor.**

A graphic example is the still-delayed arrival of the ‘paperless office’. **People are in fact using more paper than before** – to print out documents received by email. And while technology offers the possibility of new systems of storage and retrieval, **for many workers piling (of paper but also of incoming emails) beats filing as an information management strategy.**

13. Most of the organisations studied use **ICT-based systems for the storage of simple information. And in most cases these worked well.** Five – Financeco, Consultco, Mandarinco, Logisticsco and Councilco – have also introduced CRM

and/or KM systems of varying sophistication, which were less effective for a mixture of personal, technical and institutional reasons.

First, many employees were not keen to have their hard-earned human capital made freely available. Second, there was in any case rarely a positive incentive to use the system. Third, training and support on the use of the systems was patchy at best; and fourth, the ‘solution’ was too often an off-the-shelf product insensitive to the needs and character of the firm. The result was that local PCs and individual people tended to contain more timely and more personal information than the firm-wide systems. Workers are hoarding and hiding (sometimes with the most innocent of motives) vital intellectual capital.

14. **The main character in the communication story is email.** Powerful myths about inbox overload abound, and our research showed surprisingly low tolerance: even top-flight professionals at Consultco said that 30-40 emails a day was ‘excessive’. **The two problem areas are spam and inappropriate mailing, but overall there was no evidence for the email avalanche described in the media.** ■

EXECUTIVE SUMMARY

Executive summary

Email is much more than a communication tool: it acts as a prompt 'I even send myself email reminders' a workplace, a holding place for ideas, and a contacts book. At Researchco, most staff had between 1000 and 2000 emails in their inbox.

15. Nonetheless real conversation is favoured. Even when information was available online, verbal requests were common and faster: 'do you know so and so's extension number?' Technology has vastly increased the number of routes by which people can communicate with each other. We found that **people are negotiating this communication 'matrix' with great skill**, often using a combination of approaches, or different techniques for different people and different purposes.

It's how I feel

16. The attitude of most workers to technology is one of incurious pragmatism spiced with sporadic outbursts of frustration – 'I did save it, you stupid thing...I hate computers'. One in seven have trouble turning their computers on: a fifth struggle to print. And few people show a desire to experiment with ICT. Consultco has introduced a bespoke Instant Messenger (IM) system, to which a typical response was: 'I can just as easily pick up the phone or use email'.

17. Many people associate ICT with work, and are keen to establish boundaries accordingly. If the old division of labour was based on physical space, the new one may be based on the use of specific kinds of technology: PCs and mobiles = work. Indeed, **some respondents were determined not to have a computer at home precisely because of its work connotations.** Rather than breaking down the divide between work and life, for many people technology has become a key defensive line between the two: 'When you're on holiday they call you, even if it's a personal mobile... I don't agree with that'.

18. Modes of communication reflect and reinforce hierarchies. Ownership of new pieces of kit signals status, and can therefore breed resentment. Senior staff get better equipment and better support – because their time is seen as more valuable. And **status is also signalled by the way ICT is used:** busy senior staff sending terse, mistake-ridden messages, middle managers prefer long, complex emails with long cc fields – known as 'colleague commandeering' in one organisation – while backroom staff send jokey emails to friends.

On the top floor

19. The response of most senior managers to ICT in their day-to-day working life was the same as most of their employees: pragmatism. In some cases, senior staff who have not 'grown up' with ICT are even more disconnected: 'lots of 40 or 50-somethings can't even type – they're not that interested. The short run costs of switching the tools you use are too high.'

20. But organisational leaders are also reacting to a number of pressures that drive ICT strategy. Three stood out in our research. First, competition. Senior managers at Consultco were testing BlackBerry handheld computers for mobile email with some staff, explaining that: 'if the competition make their staff work 24/7, we will have to follow.' Second, customer focus. In companies such as Financeco, quick availability of customer information was vital. But this is also an issue in the public sector, where ICT was seen as an ally in shifting towards a customer-service ethos. Third, targets. In the public sector, many organisations are working towards specific goals for the quantity and quality of electronic service delivery.

21. The depth of strategic response to these pressures depended on two principal factors: size and sector. Big players, with earmarked budgets and dedicated IT departments, are very ■

Executive summary

different from smaller firms where an individual is responsible for technical decision making. Firms with a high ICT content in their core activities were also thinking more strategically. We observed very different levels of mainstream management engagement in thinking about ICT in, for example, Designco (a new media company), Financeco (which relied on ICT to win and keep business) and Lawco (where ICT is treated as one of many office tools).

22. Leaders set great store by ICT in the creation of networks. Only one case study – Logisticsco – could be truly described as a ‘network enterprise’, but others had aspirations. ICT played an important role in linking divisions, but **while technology may now be a necessary network component, it is certainly not sufficient.** In some organisations, such as Consultco, which were born of a merger, legacy ICT systems were a significant challenge – ‘the systems do not fit’. And in most cases, senior management descriptions of networks were overly optimistic. The IT director at Councilco saw technology as an essential tool in bringing geographically far-flung departments into the fold, and creating ‘a more collegiate feel’. But connecting the information services in the borough to a national intranet, rather than the

local network, had left staff in libraries feeling less connected than before.

23. The use of ICT for controlling the activities of workers is a live debate. Certainly the capacity of technology to count keystrokes, filter emails and monitor internet use is a new dynamic in the workplace. **In practice, however, few organisations actively monitor activity: as one IT director said: ‘If only we had the luxury of that time!’** Curtailing access to certain websites, forbidding downloads or developing protocols – such as personal internet access during lunchtime – were common, for a mixture of security and management reasons. In other, more permissive environments, staff were trusted to manage their own use of technology.

On the top floor

24. Tools are typically only as good as the people using them. And ICT is no exception. **While the levels of ICT skills have risen rapidly in recent years, our research suggests a significant shortfall in capabilities. And most learning is informal, grounded and peer-provided, rather than through formal training.** This ‘learning’ on the job approach has advantages – and is a vital part of day-to-day office life – but is increasingly inadequate. Busy people are not

incentivised to take the time to upgrade their own skills – at Consultco, ‘no consultants could remember having training on Lotus Notes, the de facto working space’ In one organisation, informal learning has been made semi-official by the creation of volunteer ‘champions’ with expertise in particular areas.

25. **There are some signs of excellence –** Financeco gives recruits six weeks to learn the CRM system; Mandarinco conducts a full audit of ICT skills. **But the overwhelming message from our research is that the absence of sufficiently developed skills is holding organisations back** from realising the full potential of their investments in ICT. A mixture of informal and formal learning is effective: but both require commitment and investment.

26. **New ICT systems are often dropped into organisations with little investment in awareness, training and buy-in.** Employees are sceptical of the claims of a new system, and also reluctant to lose one bundle of knowledge in order to acquire a new one. As one IT director recognised: ‘People are suspicious of this stuff’. Resistance to change is natural, and firms cannot meet every concern and need. ■

EXECUTIVE SUMMARY

Executive summary

But the lessons of our research are: clearly link new ICT to an organisational need; provide fast, effective training; devolve as much as possible to department or team level; and, most important, keep ICT change out of the technologists' ghetto.

'The people downstairs'

26. 'IT people live in their own kingdom'

This is a typical description of the role of IT specialists, who are seen in many organisations as a law unto themselves.

The IT department is often separated spatially, culturally and structurally from the rest of the business.

Stereotypically, they blamed employees for being lazy and IT-illiterate: while the employees blamed them for system failures and poor communication.

There are signs that IT departments are becoming more friendly to their internal 'customers' – but slowly. Half of UK workers think IT staff 'talk another language'. **On the other hand, many support staff suggest that users become dependent on them for simple, repeated tasks, rather than learning for themselves.** One said of a colleague: 'Her name is a byword for computer failure...some talk of her emitting a force field that destroys machines'.

28. The broader ICT industry can sometimes be its own worst enemy.

The breathtaking claims made for

technologies or applications in sales pitches and advertising sow the seeds of discontent. Similarly, dire warnings of Armageddon following a failure to spend: the Y2K bug being a case in point. It is of course necessary for senior executives to become more savvy themselves about the true possibilities of ICT – **but the industry also needs to build better relationships with customers if the current scepticism is not to harden into outright cynicism.**

Low tech equilibrium

29. As far as ICT is concerned, many firms are getting by, but not getting on. They have settled into a **low tech equilibrium: technology is a 'hygiene' factor rather than a motivator for higher performance.** And in sectors, many firms see little point in investing further except under the pressure of competitive forces. At the same time, **unless and until significant numbers of players in a market are using a technology, network effects are limited.** So whole sectors – such as the legal profession – end up in low tech equilibrium too.

30. What **lessons** can be drawn?

First, that **new technology is not transformational on its own.**

Organisational change unlocks the value of technological change. Second, **the rhetoric of the IT industry is a long way from reality** – and this gap is stoking scepticism. Third, **the pace of ICT**

investment is likely to slacken unless the low tech equilibrium is broken.

31. Millions of workers in the UK, and the organisations in which they work, deserve a better deal from their technology. But the solution is not a technical fix: it is a change in attitude, one which sees that technology only creates the opportunity for, not the certainty of, change. **Buying the kit is the easy bit. Making it work, helping ICT to make Britain work better, is where the real energy is required.** Information and communication technology does matter. The challenge now is to make it count. ■

Introduction

Mid-afternoon, Mary's having a conversation with her laptop and a spreadsheet that is causing her trouble. *'I just did save it you stupid thing'* she says, then turning to the researcher and muttering under her breath, *'I hate computers.'* *'Right, I'll try again...'*

Mary's problems are real – and she is not alone. All of us know the feeling when technology lets us down at work, and many of us would react as she did. A 1999 MORI survey suggested eight in ten computer users had seen co-workers subjecting their machines to verbal or physical abuse. A quarter reported their machines crashed daily, with three-quarters claiming IT staff were unable to help.¹

Four years on, this report argues that Mary's experience remains the rule, rather than the exception. We suggest that many worries about technology at work are well founded. Workplaces across Britain are suffering from a 'low tech equilibrium'.

iSociety's year-long project on work and technology has looked under the bonnet of British companies. It provides a valuable stock-take on the state of ICT in the UK. Our approach has been distinctive. First, we deliberately chose not to undertake aerial view, number-crunching research. Instead, we started at ground level and focused on organisations and individuals. Second,

rather than look at the 'back end' of technology, at infrastructure or systems, the research focused on the front end, the workers and managers who use information and communication technologies (ICT) on a daily basis.

In doing so, the research draws on a number of academic traditions unfamiliar in business or policy-focused work.

Third, rather than rely on what people say they do, we focused on what they actually do. Using ethnography, interviews, context research and digital photography, the research provides a warts-and-all look at how technology really works, how it is really used and what people really think about it. The research depicts the complex reality of organisations and sets out a range of perspectives, from boardroom to shop floor.

At the heart of the project are eight detailed case studies, drawn mainly from the service sector. They include a cutting edge digital design house, a multi-national business services firm, a global logistics player, a firm of high street solicitors, a local council,

a Whitehall department, a financial services call centre and a market research company. These case studies do not put a figure on technology's added value. But they do provide a rich and revealing picture of technology in a range of British workplaces. New technology often seems to under-perform. It is not always as useful as is claimed. Despite success by some, however, many UK workers and managers don't – or can't – make the best of what they have.

This matters, now more than ever. Over the past two decades, billions of pounds have been poured into new technology in the hope of transforming British workplaces, industry performance and working life. On one level, the change is clear. Information and communication technologies have become pervasive in many industries, workplaces and jobs. In most firms, a range of standard processes is now computerised; most employees use at least one ICT on a daily basis. The UK has computerised, dramatically. ■

INTRODUCTION

Introduction

At work, new technology seems here to stay. But the gut feeling towards ICT of many commentators, executives and ordinary employees is one of scepticism, cynicism and apathy.

The sense is that ICT has promised far more than it has delivered, that making technology work on the ground is bafflingly complex; and that further investment in ICT is unlikely and/or unnecessary.

This mood of gloom crystallised in Nicholas Carr's 'IT Doesn't Matter', published in May 2003 in the *Harvard Business Review*. In it, Carr suggests that investment in ICT no longer provides any strategic advantage to an organisation. Instead, it has become a commodity, like office furniture or plumbing. Buying more of it rarely makes a firm any better. The article was discussed and dissected in every boardroom, helping a cloud of techno-scepticism build over British business.

In fact, the truth is much messier. Workplaces are complex ecologies: simply dropping in a new technology doesn't always lead to predictable outcomes. Technology becomes part of a socio-technical system. Politics and structure colour strategy: competing agendas, the dynamics of power relationships and the distance between decision-makers and the ground can all distort what happens and who gets what.

New technology has given some people more choice and flexibility, particularly in communication, where multiplying choices are handled adeptly. But in other ways, ICT helps create as much work as it saves. Setting up and maintaining new hardware, software, systems and infrastructure can be a job in itself.

And many 'solutions' are anything but. Time and time again, it is people who plug the holes in technology. Where official systems fail, people default to personal solutions: overflowing inboxes, bulging hard drives and piles of paper on desks and in corners. Information management, control and surveillance, networks and integration are all areas where new technology is less useful than it could be.

So Carr is half right. ICT is sometimes less useful and groundbreaking than it is painted. New technologies often seem poorly designed, delivered, managed and maintained on the ground. Managers often lack the interest, staff often lack the skills to do it any better. The result is low tech equilibrium. Lack of interest at the top, poor management decisions, disconnected IT people and low skills on the ground produce a second-best outcome. People and firms are getting by, not getting on.

Worryingly, what happens in firms is multiplied across them. There is no

incentive for one organisation to change if clients, customers and suppliers do not change with it. Even if organisations understand they could do better, it may be rational for them to do nothing. In this way, low tech equilibrium extends across individual workplaces to characterise much of the UK economy.

These findings have a depressing familiarity about them. Too many British organisations do not appear to be acting on the lessons of previous experience with ICT, or basing decisions on a sound understanding of where technology can help. The wider implications of such a scenario are not comforting. A decline in job satisfaction and commitment has taken place at the same time as computer use has spread. The research presented here suggests the two may not be unconnected, and that organisational and industry failure to capitalise on investment in ICT plays some role in low productivity, low engagement trends in the UK.

New technologies have the potential to lift productivity, speed innovation and – most important – to enhance the quality of working life. Much of this potential remains to be realised. The spread of ICT has placed a powerful set of tools in our hands. The challenge now is to use them fully. ■

Chapter 1

Background and report structure

How will new technology change working life?
There is no shortage of answers. As ICT appears to be making spectacular impacts on the way we work, predictions about the impact of new technology have become almost as pervasive as the technology itself.

Broadly speaking, ICT is linked with four types of change:

- new forms of work organisation and management inside firms
- new work styles and workplaces for individuals, the employed and self-employed
- new physical distributions of economic activity in industries, regions, nations and internationally
- new forms of economic activity, such as the ICT sector and business sectors wholly dependent on ICT.

A number of perspectives about the nature and process of change have emerged from popular and academic debates.

A group we tag 'optimists', for example, suggest that automation and new technology generally makes work better.² In particular, they tend to argue that ICT will transform manual work by requiring new skills and encouraging multiskilling. This will trigger a series of changes in work organisation and employment relationships – such as decentralising decision making, encouraging greater worker autonomy and helping team working to spread; high levels of employee commitment, sustained

by good working conditions and opportunities for internal progression.³

Pessimists, in contrast, feel that new technology will generally make work worse.⁴ Essentially, ICT will deprive workers of their autonomy and reduce their control over what they do. Work will become more boring, workers less skilled. Staff will be increasingly isolated, monitored and controlled by technology. Worst of all, this process of 'degradation' will apply to the office as much as the factory.⁵

Cutting across this are debates about the extent and process of change. Enthusiasts tend to argue that ICT plays a significant role in changing work.⁶ ■

Background and report structure

Whether good or bad, ICT leads to new types of company structure, new forms of careers and work styles, and new forms of network-based organisation across the economy. The emergence of technology-powered networks is a key driver of all of this. Enthusiasts tend to be confident that change will be broad and rapid.

Sceptics, in contrast, tend to downplay the power of ICT to transform workplaces and working life fully.⁷ They argue that while new technology might help change some working practices, this tends to be confined to a few sectors and some individuals. More broadly, they argue that the nature of technological change is slow and uncertain: there's a lag between the appearance of a technology, its diffusion and its efficient use.

Unpicking these viewpoints is not straightforward. To do so, this research deploys two approaches. We begin with a macro approach, reviewing existing evidence about change in new technology, organisations, labour market and the economy. This leaves a number of gaps and unanswered questions.

To try to fill these, we then use a micro approach, focusing on what goes on inside organisations, and on the attitudes and behaviour of workers, managers and IT staff, and on interaction with the ICT industry.⁸ This approach uses a number of qualitative techniques, in interviews and detailed case studies.

We focus on four distinct aspects of ICT: hardware (eg PCs, printers, mobiles and peripherals), software (eg office programmes, email, instant messenger, internet browsers), systems (eg databases) and infrastructure (eg cabling and wireless networks).

Our aim is to find answers for four key questions:

- How are individuals using ICT in their work?
- How are UK organisations planning, diffusing and managing ICT?
- How does the experience of ICT differ across sectors, occupations and position in organisational hierarchies?
- Are the supposed benefits of ICT being realised in UK organisations? How much does ICT matter?

The report is structured as follows.

Chapter 2 sets out the macro material, and provides a high-level review of trends in technology, organisations, the UK labour market and economy. This material will be familiar to many readers.

Chapter 3 picks out the gaps in the macro material and sets out the key framework and concepts of the micro approach. It stresses the need to look inside organisations to understand the nature of change.

Chapter 4 outlines the research methodology and introduces the case studies: the organisations and some of the people we spent time with.

Chapters 5, 6, 7, 8 and 9 review the primary research. Chapter 5 focuses on tasks and tools; Chapter 6 on shopfloor attitudes and culture; Chapter 7 on management attitudes, strategy and behaviour; Chapter 8 on skills, learning and change; and Chapter 9 on IT staff and the ICT industry. Chapter 10 summarises the main findings and outlines the notion of low tech equilibrium.

The report concludes by setting out the implications for organisations, industry and public policy, and makes some outline recommendations for practical change. ■

NOTE:

- a Throughout the research we refer to staff dealing with ICT in the conventional way, as 'IT staff', 'IT department' or 'IT personnel'. We refer to the technology industry as the 'ICT industry'.

Chapter 2

Technology all around us: key trends

This chapter reviews the major trends in the spread of technology and associated changes in organisations, work styles, the labour market and the economy. It presents the macro or aerial view of what has happened.

Watch any TV series or film made more than 20 years ago: if there are any scenes in workplaces, the lack of technology will be striking. It makes the whole thing seem much older – almost as if the male characters were wearing wigs and breeches.⁸ Desks without computers now look peculiar: ICT has become an integral part of many British workplaces.

This chapter reviews the major trends in the spread of technology and associated changes in organisations, work styles, the labour market and the economy. It presents the macro or aerial view of what has happened.

Computer use and computerisation

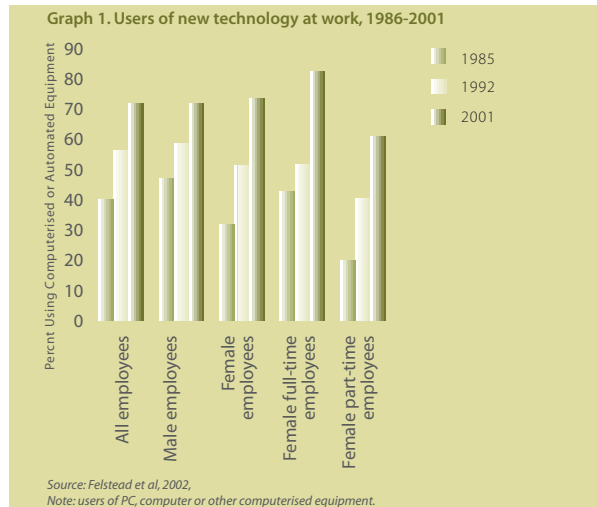
The use of computers and other forms of information technology advanced significantly during the 1980s and 1990s. In the mid 1980s, less than half of all employees used a PC or other computerised equipment at work. Now, nearly three-quarters of all employees use a computer or other ICT in the workplace. Over the same period, the gender gap has closed, and women have even overtaken men as users of ICT at work.

The diffusion of ICT varies considerably by industry and occupation. Looking at the industry cut, while almost all UK firms now have some computerisation, and

nearly four in ten have all their staff using ICT as part of the job, penetration varies considerably by sector. Industries based mainly in and around offices, and involving large amounts of data entry and analysis, are the most likely to have workers using most technology; those in the construction, hospitality and personal services sectors have fewest workers using ICT. But in all industries, the numbers using new technology has increased significantly since the mid-1980s.

In the vast majority of industries over two-thirds of staff now use ICT at work, and in many cases, the figure is three-quarters or more.⁹ ■

Technology all around us: key trends



Looking at occupations, a similar picture emerges. Users of new technology are concentrated among professionals, managers, associate professionals, admin, sales and secretarial workers, the vast majority of whom now use ICT at work. Even among other groups, however, there has been a striking rise in numbers using new technology. And among personal service and unskilled workers, over a third are now using technology to help do their jobs.¹⁰

These changes reflect the computerisation of a range of standard workflows and processes. Once again, the overall sweep hides differences between sectors.

A 2002 study of HR managers by Hill et al finds that:

- 79% of managers say they use computer database systems for administration.
- Across sectors, 78% of public sector managers use computer databases, as do 70% in wholesale/retail and 94% in finance/business services.
- 60% of managers in the wholesale/retail sectors say their firms use electronic tills or EPOS systems.
- 34% of managers' firms use computers for stock-taking and purchasing; although 60% of the largest firms do so.
- 16% of firms use electronic time recording and time management systems.
- 40% of firms use computer systems/data recording to keep track of what work is

being done by employees.

Even in finance /business services, only just over half of all managers' firms do so.

- Just over half of all firms do not use computers to provide employees with information about the firm (eg through an intranet).
- 60% of all establishments allow their staff to use email.
- 48% of establishments use information from computer systems to evaluate employee performance.
- 32% of firms use the internet and email to recruit, as do 46% of firms in finance/business services.¹¹ ■

Technology all around us: key trends

Convergence

The increasing interconnection of information and communication systems is one of the key shifts underpinning the spread of new technology.¹² 'Convergence' means the blurring of the I and C in ICT. New technology has become better at allowing individuals and groups to talk to each other, creating, transmitting and manipulating information in the process.

There are several aspects of the convergence process. First, the infrastructure underpinning technology use has improved. Second, and in parallel with this, hardware is getting smaller, more mobile and better at communication.¹³ Third, improvements in email, and new

generations of 'social software' allow simpler, easier group communication. Fourth, a large number of organisations now use systems that integrate information and communication functions. These include customer-facing functions like Customer Relationship Management (CRM) systems, or manager-facing functions such as call or email monitoring.

Two stereotypes symbolise how convergence has played in different parts of the labour market. The first is the 'laptop worker' – the classic symbolic analyst, now equipped with a panoply of mobile technology. The second is the 'headset worker' – the classic white-collar routine worker, typically employed in sales or customer service work delivered through

a call centre. In both cases, technological convergence has allowed employers to establish completely new types of work.

Continuity

The rise and fall of the dotcoms has not altered the basics of this new calculus. As the share price of internet startups fell through the floor, the amount of data sent round the world on the internet continued to climb through the roof. The forces that burst the 'New Economy' bubble also pinpricked some of the more inflated rhetoric about technology's transforming potential. This double deflation has helped foster a new mood of scepticism and cynicism in the business community, a sense of doubt about the benefits of new technology. ■

Technology all around us: key trends

Significant though this is, in the long term, the question is not whether ICT will become truly pervasive, but when.

Management and work organisation

How has the dramatic uptake of ICT affected the way work is done?

Technology has enabled great change in some sectors and jobs. In a few places, the big predictions have come true.

But generally ICT has had a surprisingly modest impact on UK working life.

There is more technology about.

But the transformations enabled by new technology are less radical than many commentators suggest. And although ICT may impact on their lives through monitoring and control, there remain large numbers of people not directly

affected by ICT at work.

Trends in technology need to be put in context. Key competitive factors, for instance, include globalisation, domestic market liberalisation and increased product competition: as new markets have been opened up, ICT has helped companies take advantage of new opportunities.

Behind this are some deeper economic shifts: the rise of the service economy and parallel shrinkage of manufacturing in the UK. Manufacturing in Britain has become increasingly hi-tech (Microsoft counts itself a manufacturing firm), while the growth areas of the economy are the public sector, professional and frontline

services. New technology is principally a complement, rather than a substitute for human activity.¹⁴

Social changes are also important. ICT has been an important enabling mechanism in delivering work life balance and flexible working policies. Similarly, use of ICT has been important in political and policy reform, particularly in successive transformations of the public sector, from New Public Management to the 2005 e-government targets.¹⁵ All of these factors filter the effect of technological change. ■

Technology all around us: key trends

Networked enterprises?

Some commentators suggest new technology will directly change the way organisations look and feel. ICT is supposed to allow greater scalability, easier interactivity, simpler management of flexibility, easier brand control and greater potential for customisation.¹⁶ At the least, this will allow more alliances, joint ventures and outsourcing.¹⁷ At most, it will enable the rise and spread of the 'networked organisation' or 'networked enterprise', as sociologist Manuel Castells describes it.¹⁸

These new entities are: 'less like bounded organisations and more dependent on networks of relationships with suppliers, vendors, partners,

governments'.¹⁹ The use of ICT is the driving force here: the power behind the social and economic networks, and thus, the power behind the organisation itself.²⁰ Has this happened? Up to a point. The public sector drive for contracting out has led parts of Whitehall and local government into complex, tech-supported partnership arrangements with other firms.²¹ The internet has become an important business-to-business channel.²² And more broadly, technological change has allowed completely new types of organisation to come into being. Call centres, whether stand-alone processing halls or firms' customer contact points, are the most obvious example.²³

However, the evidence suggests that these fully networked enterprises remain rare in the UK. Only around a third of British establishments have significantly outsourced, networked or formed strategic alliances with others.²⁴ Large organisations with strong brands have held off smaller competitors, or adopted aspects of their business model and competed direct. ■

Technology all around us: key trends

In 1998, around 25% of the UK workforce 'sometimes' worked at home, typically for about a day a week, and usually making use of ICT to keep in touch with colleagues and clients.

New styles of management

Styles of management appear to have changed more than the shape of organisations. Academic Francis Green outlines a series of linked changes:

*'On the one hand there have been pervasive developments in managerial strategies affecting the way work is organised. On the other innovation of new information technologies has revolutionised the control of work flows. Complementary changes in human resource policies and workforce skills have reinforced the impact of organisational and technical change.'*²⁵

The UK has seen 'co-evolution' of technology and organisations, each influencing the other. Green is clear that new production and management techniques depend on ICT, and that these may involve greater autonomy and freedom for workers. These include: 'methods such as empowerment, mentoring and employee involvement, ... as well as paternalistic fringe benefits and training geared to engender commitment.'²⁶ Castells argues firms need to offer 'autonomy, involvement and a watered-down form of co-operative ownership' in order to keep workers engaged and performing at their best.²⁷ Computerisation is an integral part of both management approaches. Here is something close to the optimistic vision of technology and work.

Has it happened? Certainly, the evidence suggests that forms of HRM became more common in British workplaces over the 90s.²⁸ However, the predicted increases in worker freedom and autonomy do not seem to have materialised. Quite the contrary: Alan Felstead and colleagues find that despite the increasing complexity of jobs over the late 1990s, 1997–2001 saw a distinct fall in worker discretion and an increase in modes of managerial control.²⁹

Technology may be used for monitoring and close control in some establishments, even if the work itself does not involve use of ICT.³⁰ At the other end of the scale, US academic Sean Ó Riain shows how highly skilled and demanding software programmers are kept in place by working conditions that encourage competition, over-work and instability. Workers have autonomy and respect; they also have exhaustion and insecurity.³¹

Work styles

Optimistic commentators argue powerfully that ICT will allow at least some people to work in a very different way. Castells states that ICT will: 'replace work that can be encoded in a programmable sequence and enhance work that requires analysis, decision and reprogramming capabilities in real time at a level that only the human brain can master.'³² Similarly, Frances Cairncross

suggests the value of companies will increasingly reside in their employees – particularly those who can create, identify and manipulate key pieces of information.³³

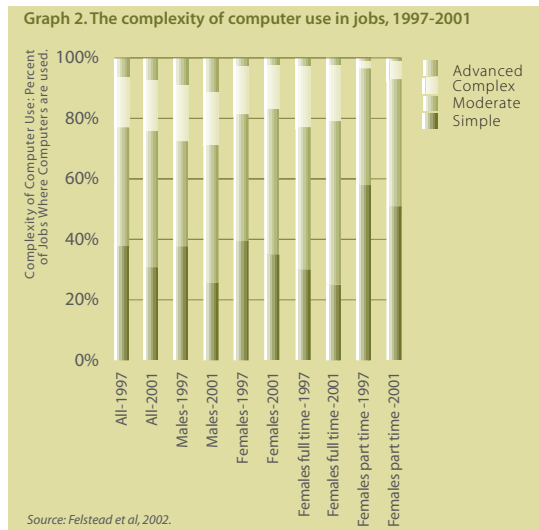
So a further implication of these changes in work tasks and processes will be a shift in the location of work – from somewhere to anywhere.

In fact, fairly few people have the working lives of the classic 'knowledge worker'. There also remain large numbers of workers in both private and public sectors for whom technology does not loom large in their working lives. Munro and Rainbird point to: 'a large number of people [who] work in low paid, routinised and repetitive work, relatively untouched by new technology... low status, low grade and with little autonomy over the work process.'³⁴

In 1998, around 25% of the UK workforce 'sometimes' worked at home, typically for about a day a week, and usually making use of ICT to keep in touch with colleagues and clients.³⁵ However, this group is far from representative of the workforce as a whole.³⁶ And far from being telecottagers in the classic sense, those who telework actually spend little time at home.³⁷ For these groups, work is becoming generally more mobile, and working remotely is part of a much bigger picture.³⁸



Technology all around us: key trends



Even for those who do work flexibly, there is still much work to do in establishing, managing and maintaining the basic systems and structures that support virtual work styles:

*'Technology may help connect from and to remote places, but once the connection is made, the real work begins.'*⁴⁹

The labour market

Transformations inside firms affect the world outside it. New technology, and firms' response to it, is connected to a number of shifts in the larger labour market.

Working hours

Computerisation and internet use by firms and individuals are associated with longer working hours in the UK. So is technology the culprit? Possibly. Even if a 'technology effect' is isolated, there are a number of possible explanations.⁴⁰ Those workers with 'portable' jobs may be using mobile or home-based equipment to work; but those working mostly with ideas may also be thinking about work (working, in other words) at times when they're not using technology. And of course, it's easy to use ICT for 'homing at work' – sending personal email, shopping or booking holidays online, or just surfing around.

Work intensity

Technology may or may not have people working longer, but it does seem to have some people working harder. Green shows that work intensification has risen over the 1990s, across the economy and across occupations. Women, those aged over 40, those in the service sector and those in the public sector have borne the brunt of the change.⁴¹

Why has this happened? New technology is an important part of the explanation. In conjunction with ICT, the new management styles discussed earlier help to raise the effort we put into our jobs. ■

'Technology may help connect from and to remote places, but once the connection is made, the real work begins.'

Technology all around us: key trends

Table 1: Job satisfaction in UK workplaces, 1992-2000

Percentage either 'completely' or 'very' satisfied with the following	1992	2000
Prospects	22	15
Pay levels	25	13
Job security	43	39
Use of abilities	54	44
Use of initiative	58	49
Hours worked	44	24
The work itself	54	41
Amount of work	39	23
Variety of work	50	37
Training	31	22
Overall	52	45

SOURCE: WORKING IN BRITAIN SURVEY (LSE, PSI)

Green finds significant evidence that 'effort-biased technical change' has taken place, and some evidence that computers specifically have helped to raise the intensity of work.⁴²

Skills

New technology could lead to upskilling for several reasons. First, ICT promotes multi skilling, enabling people to perform a number of tasks previously the special domain of others. Second, ICT automates unskilled work, and this should lower employers' requirements for unskilled staff. Third, HRM techniques demand more highly skilled workers to deal with new responsibilities and new ways of working.

There is strong evidence that this is exactly what's happened. The dominant trend in the labour market has been one

of rising skills, particularly for women – the male/female skills gap has disappeared almost completely.⁴³ ICT has helped remove large numbers of unskilled jobs over the past two decades.⁴⁴ And the spread of technology into workplaces appears strongly linked to upskilling.⁴⁵

Most strikingly, the computer skills employees require are becoming more sophisticated (Graph 2). The period 1997–2001 saw a decline in the proportion of workers using 'simple' ICT skills (such as printing out an invoice) and a rise in those using 'moderate' ICT skills (such as word processing or emailing). At the same time, a growing proportion of the workforce using technology is now required to have 'advanced or complex

information technology skills'.⁴⁶ Nine out of ten new jobs demand a capability to use ICT.⁴⁷ And studies of unskilled workers not using new technology suggest ICT skills are critical for those wishing to move onto an upwards career trajectory.⁴⁸ This picture of generally smarter management and more skilled workers is close to the optimistic scenario for technology and work. However, despite the average trend of upskilling, the pessimistic scenario of deskilling and routinisation is unfolding in some pockets of the UK labour market. Green finds that over the 1990s, for those reporting lower work effort, 43% experienced a reduction in skills demanded by their employers.⁴⁹ ■

Technology all around us: key trends

And as we will see, some employers have used ICT to break up work into simple pieces, introduce assembly line dynamics and close monitoring of staff. Even if management is behind deskilling, ICT can help bosses manage and maintain low-skill, low-autonomy workplaces.

Careers

Discussions about ‘free agents’ or ‘free workers’ sometimes suggest everyone is, or soon will be thinking and acting this way.⁵⁰ It simply isn’t happening – free workers and free agents remain very much in the minority, in the UK as elsewhere. However, ICT is fostering a quieter change at work, as recruitment and job search increasingly move online. Internet recruitment firms have been one of the few dotcom success stories, as Freeman points out.⁵¹ The vast majority of the UK’s large employers, and plenty of smaller ones now advertise on the web. In the UK, 9.4m vacancies were posted online in 2000. 75% of UK adults with internet access had searched the web for work, and 31% had looked for work online in the last six months.⁵²

Job satisfaction

More speculatively, ICT may be connected to declining job satisfaction. On the whole, Britons are becoming less satisfied with the work they have and more critical of employers. On a whole range of measures, UK workers grew less happy over the 1990s: satisfaction with

working hours and/or workload, in particular, have all dropped through the floor (see Table 4). Levels of satisfaction with training, use of abilities, use of initiative and variety of work have all also fallen.⁵³

Many factors lie behind this.⁵⁴ But there are reasons for thinking ICT may be among them. We already know that new technology is linked to greater intensity and strain at work. We also know that technology can be used to make work less skilled and more routine.

There may also be more subtle processes at work. For one thing, if ICT is the enabler of changes at work, one reason for dissatisfaction may be poor design, diffusion and maintenance of technology. For another, if changes in technology are closely intertwined with new management techniques and ways of organising work, then unhappiness with what the boss says and does may also be tied up with the way technology is maintained and made available. We will find plenty of evidence for both hypotheses in later chapters.

Productivity

If new technology has helped organisations get more out of less, this should boost productivity in the macroeconomy. There is a broad consensus that this is what has happened in the US in recent years. American productivity grew over the 1990s, and significantly, continued to rise in the second half of the decade,

bucking expected trends.

There have been vigorous debates over the size and scope of these changes. Some have suggested the figures reflect mostly cyclical change, with no long term effects.⁵⁵ Until recently, moreover, high-tech firms seemed to have generated most of the gains, even though firms across the economy had invested heavily in ICT.⁵⁶

Technology appeared to have raised labour productivity throughout the economy, but many firms were not yet getting the full returns on their capital.⁵⁷ These debates may now be dissipating. Recent data suggests things are beginning to change, with productivity gains coming through to the wider US economy.⁵⁸

These gains do not yet appear to have materialised in Europe or the UK. Recent studies suggest that ICT has contributed substantially to UK productivity growth over the 1990s.⁵⁹ Government economist Nick Oulton, for example, argues that ICT accounts for a quarter of the growth in UK labour productivity since 1989, and almost half since 1994; technology has contributed almost a fifth of UK GDP growth between 1989-1998.⁶⁰ Nevertheless, UK productivity growth appears to have slowed in the late 90s. ■

Recent studies suggest that ICT has contributed substantially to UK productivity growth over the 1990s.

Technology all around us: key trends

According to economist Jonathan Temple, in Britain 'the Solow paradox is alive and well: high-profile ICT investments are failing to raise the overall growth rate.' Since cheaper, faster technology is available to everyone, why have some firms in the UK apparently performed worse than many of those in the States? And why have some firms in both countries put the money in and failed to get the results out?

In the UK, the recession of the early 90s and the strong pound from the middle of the decade are blamed for making life hard for firms, particularly in the manufacturing sector.⁶¹ Oulton also suggests that network effects may have played a part in the UK: simply, there have not yet been enough users of new technology to allow businesses to benefit.

Beyond the ongoing exogenous impacts, though, firms themselves may have something to do with it. The superior performance of high-tech firms in both countries may largely come down to their superior knowledge and experience of ICT – 'it's in their DNA', as one of our expert interviewees put it.⁶²

Timing also seems important. UK companies invested less and later in ICT than firms in the US.⁶³ This means that 'ICT investment may have incurred large adjustment or learning costs', as British organisations and their managers grapple

with the new tools and work out how to get the best out of them. US firms, by contrast, may now be starting to see the gains from previous hard work.⁶⁴

Summary

This macro approach begins to answer our initial questions. The UK has seen widespread increases in computer use over the last two decades, and increasing convergence of information technology and communication technology. The rise and fall of the dotcoms may have dented the mood of optimism about ICT, but it has not, so far, reversed these or other trends.

Adoption of technology in UK workplaces has helped bring about significant changes in working life. Many of the most discussed and most colourful changes have been confined to a minority: call centres, networked enterprises, headset workers and mobile professionals remain unrepresentative.

For the majority of organisations, new technology is associated with new forms of management and the computerisation of a number of key workflows and processes. For the majority of workers, new technology is associated with increased skill requirements and work intensification. And computerisation appears to have had some impact on macroeconomic productivity.

However, these are stylised facts, at best. They do not tell the full story,

and in each case, counter-examples can be found. The overwhelming feeling from the aerial view is one of complexity. Where technology meets society, multiple outcomes result. There is no single story of change, and some apparent contradictions. Why have some organisations changed radically and others not? Why have some workforces upskilled, and others lost skills?

Why, despite years of investment, does the UK economy not appear to be showing the gains it should from ICT? What has been the actual impact of ICT on the quality of working life? How do workers feel about the technology they are using? And what is going on inside UK organisations? On the shop floor, how much does ICT matter? ■

Chapter 3

Ecology of the firm

It is hard not to pick up a sense of disappointment in many boardrooms about the difference ICT has made to their organisations' performance.

Today's scepticism makes finding answers more urgent: but the aerial view taken so far leaves a number of complexities, contradictions and gaps to be filled and unpicked.

This chapter sets out the key frameworks and concepts required to answer the questions that remain. It outlines some basic ideas about how technology impacts on society, then shows how these notions can be used to explain how ICT is developed and put to use inside real life organisations. The key lesson is that firms that simply install the technology and stop there will see a pretty poor return. It is the indirect contribution of ICT that is significant –

when technology is coupled with other changes.

Does ICT matter?

Nicholas Carr's now notorious article 'IT Doesn't Matter' neatly articulates a widespread unease in the corporate world. In essence, Carr argues that investments in ICT are less and less likely to deliver a competitive edge to an individual firm. ICT is becoming an everyday commodity:

'Chief Executives now routinely talk about the strategic value of information technology, about how they can use IT to gain a competitive edge, about the 'digitization' of their business models. ... the point is, however, that technology's

potential for differentiating one company from the pack – its strategic potential – inexorably declines as it becomes accessible and affordable to all ... the opportunities for gaining IT-based advantage are already dwindling.⁶⁵

As we shall see later in the report, there is much in Carr's analysis to take issue with. But whatever its merits, the piece has touched a nerve, distilling a general sense of boardroom scepticism about ICT and its impact on performance. ▀

Ecology of the firm

Table 2. Attitudes to technology at work, 2000

% of those using technology in their jobs	Essential	Very important
Managers / administrators	80	8
Professionals	64	21
Associate professionals	63	13
Clerical / secretarial	84	10
Craft and related	51	22
Personal / protective	42	30
Sales	71	13
Plant and machine operatives	51	29
Others	26	35

SOURCE: WORKING IN BRITAIN SURVEY (LSE, PSI)

'Strategy is not a very strategic term now. Strategy sort of died last year for a lot of us.'

The dotcom crash has helped swing the public conversation from enthusiasm to scepticism. As one finance sector CIO put it:

*'Strategy is not a very strategic term now. Strategy sort of died last year for a lot of us.'*⁶⁶

Much as Carr suggests it should, technology strategy in these firms had already changed from an aggressive, risk-taking approach to a much more cautious one.⁶⁷ And there is a creeping feeling in many firms, that 15 years down the line, the benefits they were promised haven't fully materialised – and that inside the company, supply from the top hasn't been matched by demand from the shop floor. It is in response to exactly this mood that in 2002, Microsoft, Xerox, HP and a host of US technology players formed the Information Worker

Productivity Council, a three-year, \$5.4m programme to investigate and quantify the impact of ICT on productivity.

Debates about the usefulness or otherwise of ICT are part of a larger conversation about business performance and responsiveness. In *The Support Economy*, for example, Shoshana Zuboff and James Maxmin argue that businesses have totally lost touch with their customers. The latter half of the 20th century, they suggest, has bred consumers and citizens so demanding that corporations have been left in their wake: 'people have changed more than the commercial organisations on which they depend' The result is a double 'crisis' of competence and confidence.⁶⁸

Questions about organisation and

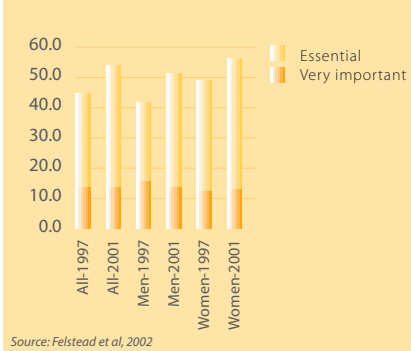
management are at the heart of this. Technological tools are an essential part of many big firms' armoury. If poor use of ICT has helped create this situation, will proper use of ICT be part of the solution?

We find similar thinking in debates about 'agility'. Again, whatever the merits of the term, the debate taps into clear business fears about remaining responsive to circumstances and customers. The Future Foundation wryly point out that: 'one of the striking things about agility is that it seems to have arrived from nowhere and can mean just about anything, but nevertheless functions as a highly desirable characteristic for an enterprise to have in 2003.'⁶⁹

Agility is about remaining effective in a changing world. ■

Ecology of the firm

Graph 3. The centrality of computers in jobs, 1997-2001



Source: Felstead et al, 2002

Economic and social trends mean key consumers' needs are becoming more fluid and flexible. Companies feel they need to be nimble to keep hold of them. Again, the effective use of ICT is one of the key drivers of agility, allowing 'good connectivity' and a more 'connected enterprise'.⁷⁰

Some organisations may not yet have made the necessary investment. But given that a good deal of money has already been sunk into ICT, this suggests the tools of agility have either failed, or are poorly understood and poorly implemented. So it seems critical to understand what UK organisations are actually doing with all this technology.

To do this, we first need to take a step back. Understanding ICT at work requires understanding ICT in society as a whole.

Push or pull?

Technology does not directly change society: change is a much slower and less certain process. Essentially, people take time to trust a technology, understand what it can do and integrate it into their lives. Technology pushes, society pulls, and in-between peers, culture and a host of other factors influence outcomes. As Manuel Castells argues:

*'People, institutions, companies and society at large, transform technology, any technology, by experimenting with it ... Since our practice is based on communication, our lives are deeply affected by new communication technology.'*⁷¹

Few people are happy to shape behaviour round the latest kit. However, most are pragmatic or sceptical towards new

technology, influenced by peer behaviour and tend towards everyday uses for existing purposes. It is only after some time that ICT generates new ways of doing things, and becomes a comfortable and integrated part of life. Previous iSociety research suggests the majority of Britons are either pragmatic about or actively averse to ICT.⁷² Gradual adoption, adaptation and domestication are the order of the day. US technology journalist James Gleick puts this point well:

*'It may as well be a law of modern life. Once it was true of machines ... and now it is particularly true of the technologies of computing and communication. First we disdain them and we despise them; then we depend on them. In between, we hardly notice a transition.'*⁶³ ■

Ecology of the firm

At work, things may be very different. Since much of employees' activity at work is directed by superiors, or part of a standard process, on the face of it the encounter with technology in the workplace seems distinct from that outside it. However, the same forces seem to be operating here as well. For large numbers of people, ICT has become an important part of work. This is clear even when we focus on one type of hardware. In 1997, nearly 58% of UK workers felt using 'a computer, PC or other types of computerised equipment' was important or essential to their job. Five years later, this had risen to nearly 69%. Women are now just as likely as men to consider ICT use essential.⁷⁴

This headline figure hides some substantial differences across occupations. But on a broader measure of ICT, it is clear that technology use is important or essential for people across the labour market.

So are organisations, as embodied by management, slowly changing their strategies and behaviour, adapting to the new technological tools available? Yes. As individuals learn, so do institutions.

Technology, productivity and performance

Looking at productivity trends and performance provides a good example of how this kind of approach can be valuable. It also sheds some further light on what is happening in the UK and elsewhere.

Macroeconomic trends are the result of thousands of decisions by organisations and individuals. If the latter need time to adapt and learn how to use new tools and techniques, then this will impact on the bigger picture. Productivity trends in the US suggest exactly this process has taken place over decades, with the introduction of waves of ICT. Between 1973 and 1984, for example, total factor productivity growth was 2.5% of GDP. Between 1973 and 1990, it fell to 0.7%, then rose to 2.0% between 1995 and 1998.⁷⁵

US productivity growth appeared to fall during a massive increase in IT investment, and then rise as that investment continued and accelerated: the much discussed 'productivity paradox'. As economic historian Paul David has pointed out, similar patterns occurred after the introduction of the dynamo in the 1880s. In that case, the economic benefits did not appear for

another 30 years. Industry needed time to adjust from steam power to electrical power.⁷⁶

The economic benefits of ICT are already becoming apparent in places, but as David and others suggest, many economies are still in transition, as firms and their workers adjust around the new paradigm, some faster than others. Productivity lags are explained by people – either working in organisations, or running them and by poorly designed technology.

There is now evidence to suggest this is exactly what is happening. OECD economists Andrea Bassanini and Stefano Scarpetta have analysed growth and technological change across countries in the OECD area. They explain the slowdown and recovery in US growth as the consequence of 'a gradual diffusion of a general purpose technology'. The very different performances of the UK and other countries are explained the same way:

'The diffusion of a general-purpose technology and the development of the related institutions and human capital involve a lot of trial and error, learning by doing and self-reinforcing coordination failures which lead to **■**

Ecology of the firm

*a non-linear relationship between the beginning of the economic exploitation of the technology, its pattern of diffusion and the effects of aggregate productivity growth ... the slower the transition to the new technological paradigm ... the longer the productivity slowdown and the less marked the subsequent recovery*⁷⁷

OECD countries outside the US, many of which have not performed as well as the US may, they suggest, see greater ICT-driven growth in the future, since organisations' adjustment costs are being borne now, rather than in the past. Having invested less and later in technology, UK firms, in other words, still seem to be in the process of experimenting with their new tools.⁷⁸

Organisational learning

This analysis suggests organisations that learn faster – and make the necessary adjustments – will perform better. US academics Erik Brynjolfsson and Lorin Hitt have tested this by looking at the effects of computerisation on a sample of 527 US firms. The authors looked at the effects of computer investment on the firms' productivity and output growth during the period 1987-1994. They found that over a year, returns to technology were in line with normal

returns on hardware. Over five to seven years, however, returns jumped five-fold. In the long term, investment in new technology began making a significant contribution to firms' productivity.⁷⁹ Brynjolfsson and Hitt suggest that to make a difference, investment in computers has to be accompanied by: *'Relatively large and time-consuming investments in complementary inputs, such as organisational capital. This means spending time altering business processes, organisation structure and innovations in customer and supplier relations.'*

There is a larger lesson here. Firms that simply install the technology and stop there will see a pretty poor return. It is the indirect contribution of ICT that is significant – when technology is coupled with other changes.

Strategic change of this kind is a gradual process, involving all the experimentation and learning that individuals do, on a larger and much more complex scale.⁸⁰ As the macro analysis suggests, UK organisations seem to be still undergoing these processes, despite the large changes that have already taken place. Among other things, effective learning requires effective

management and good communication of ideas, something that UK organisations are not famous for. As Taylor states:

*'Only a small proportion of establishments are yet integrating the use of new information technology into many of their key business activities. It is going to take time before the majority of firms have created well integrated systems of information technology and shown an ability to use the information compiled in an intelligent and effective way to improve their business performance.'*⁸¹

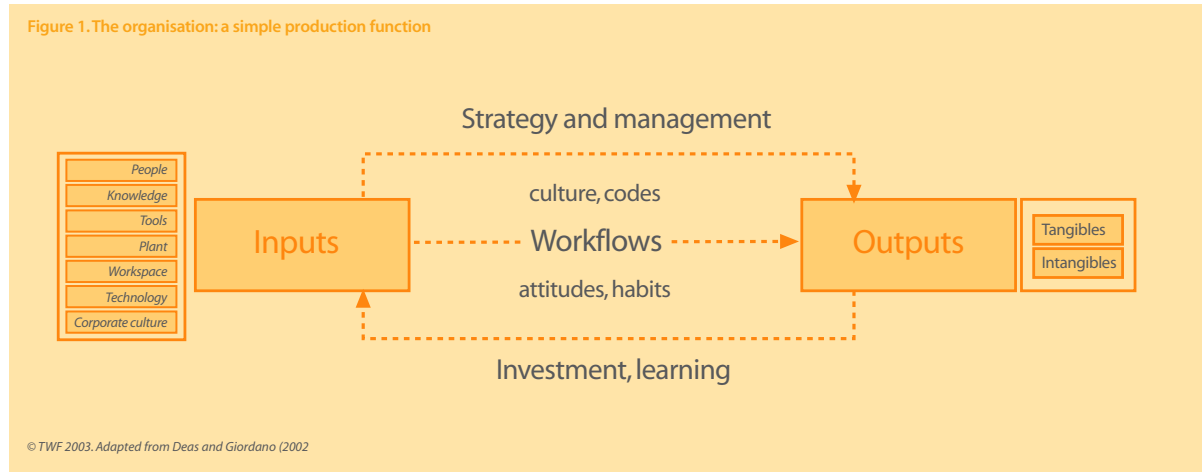
It is now clear where to look. But to do this, we require a model of the firm and of technology's place in it.

A model of the firm

We know that ICT's impact on society is the result of complex, multi-directional interactions between people, peers and technology itself. In the specific constraints of an organisation, as we have seen, much the same thing appears to be going on.

This section explores these themes in more detail, using two loosely connected concepts. It traces the contours of the modern firm, drawing on behavioural economics and using the idea of the organisation as 'ecology'. ■

Ecology of the firm



This provides the detailed social context in which technology operates, as part of a 'socio-technical system'.

At a very basic level, firms can be seen as co-ordinating devices. First, the firm is responsible for both sides of a contract. This eliminates some of the uncertainty and costs associated with market transactions. Second, the firm gets a 'grant of authority' from employees, so that they operate in the limits of behaviour it specifies (whether in employment contracts, associate arrangements or freelance projects). There is an element of the authoritarian in every firm. Third, as we know already, firms also build up 'organisational capital': defined by Hay and Morris as the detailed knowledge of individuals' abilities, and their suitability

for particular tasks and for working with each other.⁸²

Figure 1 illustrates a simple production function. Inputs are brought in. Strategy determines key processes, or workflow, and how the inputs are arranged in those processes. Tangible and intangible outputs result. Some of these may be ploughed back into the organisation's asset base, as capital or knowledge. Crucially, organisational culture, group and individual attitudes and behaviour shape strategy and workflow. They greatly influence how strategy is translated into practice.

So how does all this play out? Hay and Morris argue that: 'the firm... is the nexus of contracts which allocates the steps in the organisational decision-taking process, defines residual claims, and sets up devices

for controlling the problems that arise from having agents act for factor owners.'

This insight has important consequences, as 'the behaviour of the firm will emerge from the set of contracts and cannot be presumed to follow from the objectives of any one input owner... individuals in organisations typically have individual goals which directly conflict with each other, and... the impact of this on the firm is a main determinant of the latter's behaviour and performance.'⁸³

Far from seeing the firm as a single, unified entity, we need to recognise it is a complex social and economic 'ecology', in which individuals, groups and teams act in co-operation or conflict, and where the physical, social and cultural contours shape and are shaped by behaviour. ▀

Ecology of the firm

These complexities and tensions are built into every organisation, and act to break down simple economic certainties. The division of labour is double-edged: the specialisation it implies can generate rigidity and inefficiency, commitment to localise objectives and hence, conflict between expert groups in the firm.⁸⁴

People are also imperfect. Apart from anything else, they often have to make decisions with less than all of the facts. Simon discusses individuals' limited capacity to make rational decisions, and the underlying difficulty of getting hold of and processing all the necessary information when required. Economist Hubert Simon suggests employees typically exhibit 'bounded rationality' – basing decisions on some, not all of the

available information, then taking a decision which generates a satisfactory return, rather than the best one (in theory). This is 'satisficing': choosing to do the thing that will work well enough, rather than optimally.⁸⁵

People can act for their group or team, for the organisation, or for themselves. According to managerial economist Robin Marris, the three dominant personal motives at work are money, position and power.⁸⁶ To this we can add the linked desires for security, avoiding losses, avoiding uncertainty and living the quiet life (also emphasised by Marris).

All of this means the behaviour of different individuals, teams and groups is critical to understanding what an organisation actually does.

The distinction between teams and groups is particularly important.

Essentially, teams are formed, groups form themselves. Teams are established formally (by management) and are usually defined by function. *Groups* emerge informally (through individuals' connections).

Unions, professions, communities of interest and organisational communities (eg of software programmers) are all examples of groups. HR, IT and a set of shift-workers are examples of a team.

The leader of a team, or any leaders of a group who emerge, are potentially important figures. They may determine or influence collective behaviour, particularly in situations of major change. ■

The behaviour of different individuals, teams and groups is critical to understanding what an organisation actually does

Ecology of the firm

Group codes, rituals, friendships and networks help develop an organisation's informal culture.

The team/group of senior management, of course, are key figures in any such process. Group codes, rituals, friendships and networks help develop an organisation's informal culture. So there is a further distinction to be aware of, between formal (official) and informal (unofficial) behaviour. Hay and Morris define this area as:

'...the formation of informal groups, their objectives and communications systems, the effect of these on performance and organisational efficiency, and the limits this places on the ability of organisations as a whole to act as would a rational individual with commensurate decision-taking capacity ...'

An organisational ecology is the product of all of these forces. As a result, organisational behaviour – the characteristics of the ecosystem – is determined by the interplay of a number of different impulses inside the firm. From a production goal, an inventory goal, a sales goal, a market share goal and a profit goal, organisational behaviour will typically be some combination of these. If there are many decision-taking groups in a firm, Hay and Morris point out, none of which can be fully controlled by those nominally in charge, 'then it is no longer obvious what meaning to attach to the objectives of the firm...firms as such cannot have objectives: only individuals can...'¹⁸⁷

Technology and the firm

If organisations can be understood as ecologies, then we need to view technology as part of such a system: as a set of tools, as part of managerial strategies, but also implemented in complex, ongoing processes.

The officially prescribed functions of technology will be modified, adapted and resisted by different individuals and groups, and altered by key decision-makers as the organisation learns. Individuals' capacity to use technology as per instructions is limited by lack of knowledge and experience, and also by general limits on rationality and perfect decision-making. ■

Ecology of the firm

Table 4. Technology, organisation, ecology

Standard (tool) model	Socio-technical model
ICT is a tool	IICT is a socio-technical system
Business model is sufficient	Ecological view is needed
One shot implementation	Implementation is an ongoing, social process
Technological effects are direct and immediate	Technological effects are indirect and involve different time scales
Politics are bad or irrelevant	Politics are central, even enabling
Incentives to change are unproblematic	Incentives may require restructuring (and may be in conflict with other organisational actions)
Relationships are easily reformed	Relationships are complex, negotiated, multi-valent (the nature of the relationship with the customer makes a difference to what can become digital)
Social effects of ICT are big but isolated and benign	Potentially enormous repercussions from ICT (quality of working life, quality of life itself)
Contexts are simple (described by a few key terms of demographics)	Contexts are complex (matrices of people, services, businesses, technology, history, location etc.)
Knowledge and expertise are easily made explicit	Knowledge and expertise are inherently tacit / implicit
ICT infrastructure is fully supportive	Articulation needed to make ICT work

ADAPTED FROM KLING AND LAMB (1999).

In a phrase, technology in organisations is part of a 'socio-technical system'.⁸⁸

Socio-technical systems arise from the interplay of social processes and technical systems designed to support them. As we have seen, what inevitably arises is both push and pull: an evolving set of interactions between people, social institutions and technology.

Technology in organisations, therefore, should be seen as a set of hardware, software, systems and infrastructures; but also part of the organisation's deeper structure and character; something that surrounds many of its employees and helps configure their working day. The key features of this approach are

summarised in Table 4.

Given that technology is embedded in social systems – that people, in other words, are what make or break ICT – understanding how people interact with technology is critical. The next chapters present our research – our bulletin from the front line. First we explain our approach. ■

Chapter 4

Methods and sample

Our research sets out to find out what working with ICT is like in UK workplaces; what managers, teams, groups and individuals are thinking about, and doing with ICT.

Rather than relying on simple answers to large-scale questions, we gathered detailed information on how specific people and organisations managed their everyday relationship with technology. This 'inside out' approach yields a rich harvest of data from the frontline, painting a different and more complex picture than what usually emerges from snapshot surveys. Table 5 gives an overview of where we went and to whom we talked.

The research, then, has three goals to:

1. Get a picture of how technology is playing out across the country,

- by looking at a range of occupations (across the workforce and at different points in hierarchies) and a range of organisations (different sectors, sizes and locations).

2. Look at a range of perspectives in organisations themselves.

Capturing the ecological perspective requires uncovering a range of views around the workplace, getting a feel for strategy and practice, official and unofficial perspectives – and thus arriving at an understanding of the complex social reality of the firm.

In practice, this involves looking

at individuals, their behaviour and attitudes; how they work with others in teams and groups; and how they were supported in their work. It also involves collecting a range of management views.

3. Collect insights from the ICT industry outside the firm.

This meant talking to a range of experts, including academics, senior people from ICT firms, independent consultants, and some of the IT staff who carry out day-to-day work. ▀

Methods and sample

Table 5. Case study organisations and participants.

Case study	Type	Size	Region	Participants
Consultco	Business services consultants	L	Global	Consultants, data entry, senior staff
Financeco	Insurance / financial services provider	L	National	Call centre staff, admin, middle management
Mandarinco	Central government department	M	Greater London	Policy analysts, back office workers
Researchco	Market research firm	S	SE	Call centre workers, research workers, managers
Councilco	Local authority	M	Greater London	Contact centre staff, librarians, revenue staff
Lawco	High St solicitors	S	NW	Solicitors, secretaries
Mediacco	Communications and new media company	S	Greater London	Designers, experience architects, technical staff
Logisticsco	Transport and communications firm	L	Global	Warehouse workers, admin, senior staff

SOURCES: OFTEL, FEI

Methods

The methodology involved several elements and qualitative techniques. To begin with, we undertook a number of semi-structured expert interviews with industry and academic figures. We also organised seminars to present interim findings and to discuss the emerging issues. We then undertook a series of eight detailed case studies in a range of UK organisations. These case studies are at the heart of the research process.

Each case study involved a series of semi-structured interviews, observation, shadowing and digital photography.

Interviews covered those who plan, diffuse and maintain technology, as well as from other management figures: HR, operations and strategy. Observation and shadowing took place with three employees, usually during the course of a working week. In smaller organisations, this involved spending time with people across the firm. In larger organisations, this meant focusing on those in a single division or team. ▀

Methods and sample

Box 1: What is ethnography?

Ethnography has its roots in anthropology and is concerned with understanding people in their everyday environment. Ethnographers achieve this through participating in and observing these habitats. Ethnography is focused on the micro and below, on the activities and meaning at the level of individuals and small groups.

In this project, we used ethnographic techniques to create a good sense of what 'being there' at work is actually like in a broad range of UK organisations; to reflect the variety of voices in the 'real' world of business and organisational life; and to emphasise what people do and what they say they do and explore the connections and disconnections.⁸⁹

Ethnography is designed to understand and appreciate social and cultural contexts of action. As such it is particularly useful for uncovering people's response to new technology, and how these are interacting with the contexts in which individuals, teams and groups are operating. We were looking at what Depres calls the "context-warping spiral of events": Technology shapes the social, the social shapes the technology and it is users, in this case working people and their organisations, who sit at the centre of this process of change and interaction.⁹⁰ Our methodology, and therefore our account, is simultaneously about people, groups, organisations and the technologies operating in them.

Ethnographic methods were critical in this part of the research (see Box 1). Ethnography involves observing people in their natural habitat – in this case, the workplace – and getting a rich picture of what goes on by spending time with people and watching what they do. By avoiding the artificiality of some focus groups and formal questionnaires, ethnography allows us to get a detailed understanding of what people actually do, not just what they say they do.

These methods are particularly useful for uncovering how people are integrating and using new hardware, software and systems. When new solutions are being rolled out, people are continuously learning new things; new techniques and behaviours aren't always fully thought through or articulated. ■

Methods and sample

Places and people

This section gives some more detail on each of the case study organisations, and briefly introduces one of the three informants in each firm.⁹¹

Councilco

Councilco is a local authority in the south-east of England, serving an area of more than 200,000 residents. It provides some 700 services, from housing to crematoria, food inspection to education. Research focused on revenue services, information services and in the new contact centre. Lindsay is the website officer for *Councilco* library services, based at the main library. She helps out on the library's information team rota, assists in installing hardware and software in branch libraries, and supports staff in all branches with both hardware and software, on the phone and by email.



Financeco

Financeco is one of the world's largest financial services groups with nearly 40,000 people employed worldwide, transacting business in some 130 countries with over 20 million customers around the globe. The call centre-based business we visited focuses on commercial lines, its direct personal operation, and selected intermediated personal lines. Tom is a customer manager for sales and service at Financeco. He works in one of the company's call centres, working every day with PC, phone and a suite of bespoke software. Tom's role is to deal with and manage customer enquiries, and to convert sales opportunities into new business. CRM and call management systems shape both how he works and what he says. He works in shifts, broken down into units of 15 minutes.



Methods and sample

Lawco

Lawco is a small legal firm based in Greater Manchester. A general practice solicitor, their main areas of expertise lie in family law, probate, conveyancing and medical negligence. The firm has been in existence for over 100 years and has only ever had six partners, three of who currently work there. There are also two secretaries and an office assistant. The firm, which has recently installed broadband and an intranet, sees itself as a relatively heavy user of ICT compared to other similar companies. Legal practices often need to record and supply documents in written form, which usually means a heavy reliance on paper. Managers also suggest that given the available technology, the size of the firm and the variety of work done limits computerisation. Colin is one of the three partners of *Lawco* and has been working at the firm since 1984. Colin's daily work involves dealing with his clients' legal cases, covering various different areas of legal practice.



Designco

Designco is a digital design company located on the edge of London's principal digital quarter. The company's main activity is designing, building and maintaining websites. It employs 100 people, and contractors when required. The company is staffed by experienced architects, designers, consultants and technical staff, with about 25 non-billable administrative employees. Jane is communication manager at *Designco*, a role which has internal and external dimensions. She's responsible for PR and marketing, and for much of the knowledge dissemination and communication in the company.



Consultco

Consultco is a professional services firm, employing in excess of 100,000 people globally. It focusses on providing a range of financial support services. The company's activities and services are divided across geographic regions, the different service areas and commercial sectors. Research was conducted in two office environments in Greater London. Vicky is a consultant working in *Consultco*'s Accounting Investigations division. Her work involves very lengthy and detailed examinations of accounting and other commercial documents. (Vicky is a law graduate). She's recently returned from a long stint in the United States, from where she had been 'commuting to Germany'. She's now back at in London and based in one of *Consultco*'s London offices.

Methods and sample

Logisticsco

Logisticsco is a global organisation with operations in every continent, over a large number of sites and 24,000 employees in the UK alone. *Logisticsco* as it exists nowadays has come into being as the result of a series of mergers. Apart from a small set of central offices, most employees work in distribution centres, either moving stock about in the warehouses, working in the adjoining offices, or driving trucks. We spent time in both. Don works as the HR Information Systems manager at *Logisticsco's* head offices. Previously having worked on the company's Y2K project, Don is highly technically literate. It is Don's job to make sure that the HR information system is running smoothly and his work is dictated by the needs of the people using the HR system and by any problems that arise.



Researchco

Researchco is a small market research services firm in Greater London. Established in the late 1990s by its three directors, it has grown rapidly, now employing 20 staff in market research and finance, together with an office manager, receptionist and IT manager. The firm uses temporary staff for a small in-house call centre. Laura is one of two staff at *Researchco* who set up projects with clients on the qualitative team. She agrees the profile of people that need to be interviewed for each project with the client, and drafts questionnaires to screen potential interviewees. Much of Laura's work involves creating computer documents that are then turned into paper files which will be archived at the local storage centre.



Mandarinco

Mandarinco is an executive agency of central government, based in Greater London. It provides a strategic and policy-making role involving liaison and co-operation with the government and private sector institutions. Its primary aim is to monitor UK economic activity and to ensure that the UK remains an attractive location for conducting international business. Working at *Mandarinco* as a policy analyst, John's typical day starts at 9:30am or 10am and finishes between 6 and 8 pm. Very occasionally John has to work longer if deadlines need to be met. In the meantime, his main tasks are to stay up to date with the highly specialised information in his field and more general news in his area of expertise.

Chapter 5

Saving labour or new labour? Tasks and tools

The chapter looks at electronic tools, information and communication management. For most people, work remains much as it was, just with a growing set of new tools and techniques. In that sense, technology at work is becoming invisible, only reappearing when it goes wrong.

Two important points emerge. First, the same kinds of hardware, software and systems are used in different ways by different people, both in different organisations and inside each of them. Second, it's also apparent that in an organisation, individual perceptions and the influence of others have a big role in determining how we use technology – as much, if not more than, 'objective' features of the kit. Structural and social influence are key to understanding why what's done with technology. It's as much art as science. We spent time with a variety of workers in a range of industries (see sample description in Chapter 4). Generating, accessing and

manipulating knowledge and information was one key aspect of everyone's work. Similarly, effective communication with others was essential, as was competent handling of different media in the process. But in practice these common goals were accomplished in very different ways. Whatever their job description, all of the employees shadowed spent the working day engaged in similar tasks.

Likewise, much of the work looks the same. The similarity of many modern offices is startling: the uniformity enhanced by the ubiquitous presence of desktop or laptop computers. Piles of paper and notebooks add to the picture.

Technology is here to stay, but it is equally clear that many workers cannot live without a notebook in which to make lists or to carry to meetings. Typically a landline and a mobile will be found on the desk, and probably a diary of some description. Hand cream and a bottle of water, and some personal items (photographs, postcards, plants or fluffy animals) add character to the scene. More technologically orientated, or perhaps simply more senior, staff... might have a personal digital assistant (PDA) that is synchronised with their email and appointment software and this will be jostling for space on their crowded desk. ■

Saving labour or new labour? Tasks and tools

These visual cues reflect some broad similarities in work style and worker type. In each organisation, different needs and activities mean different types of technology are appropriate: that said, the same generic types of hardware, software, systems and infrastructure were observed in most of the study sites:

'First, and at the simplest level, we have someone like a call centre worker, who'll use a phone, PC and some bespoke applications. This person may not have email because he or she doesn't need it ... although the hardware and applications in the call centre environment might appear to be pretty simple, the systems underpinning that environment, and connecting that worker to the rest of the company will be very complex.

'Second, we have someone like a back-office worker, who will be using a phone and PC loaded with email and the standard suite of office applications. He or she will also be likely to have some business applications (package or bespoke), but still normally these are fundamentally 'end-users'.

'Third, we have someone like a data

analyst – your classic knowledge worker. They'll have a pretty sophisticated understanding and use of technological tools.

*'Fourth, we have senior, usually mobile staff who will have the same degree of sophistication, but also specific ICT needs around mobility. Its important to note that in this category people will frequently have sophisticated needs, without always having the understanding of the technology. This makes them expensive to support.'*⁹²

This covers off most – though not all – of the people we spent time with. In Logisticsco, for example, we shadowed warehouse operatives, skilled manual workers using specialist warehouse management, fleet management and stock allocation systems.

Paper and PCs: Information, technology and knowledge

The deal's off? OK, I'll rip it into tiny pieces, the document ... [which he's working on, on-screen]

Consultant, Consultant

Predictions of the paperless office feel almost as familiar as paper itself:

technology gurus are fond of heralding the arrival of ICT as the death of the printed page. Paul Saffo suggests that: 'we will become paperless the same way we once became horseless. Horses are still around, but they are ridden by hobbyists, not commuters.' Cheap electronic storage has replaced document filing; email has replaced paper memos. Paper is becoming 'ever more a metaphor and ever less a medium'.⁹³

There is little sign of this so far. Forms of ICT have not replaced paper, but are used alongside it. This is almost universally true. Abigail Sellen and Richard Harper show that we're now using more electronic media and more paper.⁹⁴ The two are complements, not substitutes. Both are needed; and holes in technology are often filled with paper – piles of it.

Sellen and Harper demonstrate that paper has some obvious advantages over current technology when it comes to 'hot' uses of data – making notes, correcting documents, reading through documents and working on multiple tasks. ■

Forms of ICT have not replaced paper, but are used alongside it.

Saving labour or new labour? Tasks and tools



Piling and spreading paper is still a much more intuitive way of working than opening and closing multiple windows on a screen. Here is Colin, a solicitor in Lawco.

By the time I arrive at 9.30 Colin is already settled into the routine of the day. Sitting at his large wooden desk, the space in front of him is cluttered with files and notes of things he has to do during the day. He has a client's case open in front of him. The client has set up a window fitting business and has written his own terms and conditions, but the terms and conditions are worded in a confusing way and require attention. The terms and conditions have section numbers which make it easy for both Colin and the secretary who will type the document to navigate the text, and aiding the dictation process. Colin leans over the document, flicking through until he finds a paragraph he is not happy with. A pencil in one hand and a dictaphone in the other, he first scribbles some amendments on the paper, then speaks into the microphone, his finger pressed down on the record button in order to let the secretary know which paragraph to amend and the amendments to make.

Even in high-tech call centre environments, paper was still an essential part of the job. In both Researchco and Financeco, staff worked with printed-out



lists and Excel spreadsheets. In the Councilco main library, staff still used a card index – immediate, portable and highly visible – to store telephone numbers, not an online directory. However, ICT has obvious advantages over paper when it comes to 'cold' uses of information, such as data storage, archiving and certain forms of presentation. The cheaper and faster the technology, the greater the advantage should be. In which case, why did we find many people printing out and keeping formerly electronic documents?

Councilco and Logisticsco employees regularly printed out emails. In Researchco, details of debtors were printed out and kept in a large concertina file. In the first case, paper acted both as a physical memory jog; in the second, as a powerful physical reminder of the money owed the firm. Our informants aren't alone in their paper habits. Steve Whittaker and colleagues studied a research lab (which had plentiful electronic data storage) and found staff kept average paper archives equivalent to a pile of phone books 63 feet high. Nearly a quarter of this had never been read.⁹⁵

Why prefer paper, even when technology seems superior? Personal preference clearly plays a part. But there are also functional reasons.

Paper enables quick retrieval, acts as a memory cue, provides an emotional

attachment (for example, old papers and projects worked on), and provides a simple record of annotations made. And when work is intense, piling may be quicker and simpler than complex filing.⁹⁶ Of course, people are also able to find electronic equivalents, particularly by using email. And for very similar reasons, electronic piling beats electronic filing. At Researchco, we found that most employees had anything between 1000 and 2000 emails in their inboxes. Some staff in Consultco had over 1 gigabyte of material stacked up in their inboxes (equivalent to a pile of 700 floppy disks).

Official information management systems often work very badly, and this is likely to influence how people store certain types of information. If people don't trust the public technology, they will default back to private means. Similarly, if people don't have the time, incentive or support to use such systems, they will fall back on their own improvised solutions, whether paper-based or electronic.

Knowledge management

There can be no questioning the significance of information to business life. Information is a critical commodity at work, a key building block of organisational capital and competitive advantage:

'If you're in a service business or if your workers are mostly knowledge workers ...' ■

Saving labour or new labour? Tasks and tools

then the processing of information is what your people do for a living. The production of information and knowledge ... is all they've got to offer. If their attention isn't focused on important information or if they are wasting their attention on things that don't matter to the business, then you are in trouble.⁹⁷

Information and knowledge management consists of systems trying to do very complex things in ways that are ideally helpful to the workers in their jobs. These systems are increasingly complex for two reasons. First, the software has become more sophisticated. Information management used to mean simple, repetitive batch processing of backroom functions like payroll and accounts. As computerising those processes has become standard in most UK firms, more ambitious KM and CRM systems have been introduced which attempt to shape individual decision-making events, and to capture and manipulate tacit knowledge. Second, as firms grow and find themselves in an increasingly information-rich environment, they have migrated from paper or people-based KM systems to technological systems. The scale benefits of ICT systems are expected to make key information available to everyone.

The problem with such systems is that, they often simply don't store all the information required, make it accessible

in usable form, or both. The CRM system is expected to do the job, but in practice, people plug the gaps. Life is complex: these systems are mostly basic.

In our research, Financeco, Mandarinco and many others had computerised basic backroom processes. Most of these worked well enough. Designco had, during the 1990s, developed a knowledge base on the company intranet as the firm grew, to the point where interpersonal knowledge was too thinly spread to ensure individuals could always find the right expert. Financeco, Consultco, Mandarinco, Logisticsco and Councilco had also introduced CRM and/or KM systems of varying sophistication. These systems tended to work less well.

Councilco's contact centre database, for example, recorded the basic details of queries and complaints from the public – customer name, job number, address in standard boxes, the details of the case in free text. This meant that only the surface information could be searched; the detail was non-searchable, so staff trying to find a pattern of cases, or a similar case dealt with in the past had to obtain the information outside the system, from 'warm sources', that is, from inside colleagues' heads.⁹⁸

Financeco's CRM system was of a different order, and noticeably more effective than the other organisations'

offerings. As it should be: the company's success in the marketplace depends on their ability to call up and make best use of customer information, and to respond speedily to enquiries and complaints. The firm is now developing a series of parallel intranets to search products, competitors' offerings, customer profiles and histories, and to allow staff to call up all of these at once. The company spends serious money on design, implementation and staff training: it's expensive but seems to pay off. Nevertheless, internal standards of communication, information storage and management seemed to slip further away from the front line (and the customer).

This suggests that inside organisations, there are a number of other reasons why information management systems might underperform, aside from inadequacies in the technology itself. Why might people not want to play ball?

First, internal KM systems are designed around a dubious premise – to extract information from people's heads and make it available to everyone. Many employees are not keen to have their human capital exploited in this way. Second, even if it can be done, they need a positive incentive to use the system. Third, they need training and support; and fourth, the 'solution' has to address the particular needs of the firm, not simply be a generic, off-the-shelf product. ■

'Steve Whittaker and colleagues studied a research lab (which had plentiful electronic data storage) and found staff kept average paper archives equivalent to a pile of phone books 63 feet high.'

Saving labour or new labour? Tasks and tools



In the majority of organisations we looked at, some or all of these were missing. In particular, most organisations took a laissez-faire approach to learning and skills; and for a number of reasons, management personnel tended not to match systems with specific organisational needs (see next chapters).

So in the face of these challenges, what kinds of responses were adopted? We found three general patterns. In some cases, everyone had – explicitly or implicitly – accepted that the technology would not deliver most of the promised benefits, and developed collective solutions to cope with its shortcomings. Usually, people simply asked each other for what the system could not give them: unable to scan the hard drive, they accessed each others' heads.

Other solutions were much less ambitious. In one department of Councilco, for example, staff simply scanned all incoming documents and stored them electronically. The system guaranteed nothing would be lost – a problem with paper filing. If they needed to find something, they would be able to find it if they looked hard enough. Here, a knowledge management system had gone from being an active to a purely passive system, a data trail (a development we also find when looking at technological surveillance systems in the next chapter).

Finally, and frequently, we found people developing their own personal solutions to collective problems. Some felt most comfortable handling information their own way; others were forced into it by the failure of official systems. In Logisticsco, those without specific databases to hand had each developed their own forms of organising and filing certain kinds of information, both in electronic and paper form. Each of these systems came and left with the employee: each new member of staff would develop his or her own system, meaning that important information might be lost.

In Councilco and Researchco, printing out emails to use as storage devices and memory jogs was common – often to the bewilderment of IT staff. Researchco staff also needed to print out emails to file with other documents for a complete record of a business relationship. In a neat reverse, software is being used to back up a paper system. Here, we find personal self-management blurring into group work and official knowledge management – everything becomes a series of micro-tasks. For the individual, piles of paper, the desk, the PC and especially email comprise the 'knowledge backyard'. There are good and bad reasons for this. People are often unsure about what will and won't be useful in the future. Lacking perfect knowledge,

they tend to err on the side of caution. Time pressure prevents proper sifting of information; in the Whittaker et al study, 74% of respondents had not cleaned their files out for more than a year. All of which means that official 'filing is a cognitively difficult task. Successful filing is highly dependent on being able to imagine future retrieval requirements.'⁹⁹

Personal storage, electronic and otherwise, can be seen as an adaptive response to data overload but also a cause of 'overload'. However it does appear to be a relatively successful means of coping. Keeping information – a message or a document – is one obvious and highly visible way of keeping it to hand: an everyday response to the need for access. It is also a function of workers' inability or unwillingness to navigate more formal knowledge management systems, such as the network beyond their PC. The result is that local machines and local desks tend to contain more timely and more personal information. For the organisation, this represents a challenge – workers are hoarding and hiding (sometimes with the most innocent of reasons) vital intellectual capital. ■

Saving labour or new labour? Tasks and tools

Getting through: communication management

Accessing and manipulating information is one thing. Communicating it is another: a complex set of tasks covering solo, virtual and group activity. Thanks to ICT and the new tools it provides, communication is becoming an ever-more complicated business. But humans are social animals: we saw our informants handling themselves with some skill. People find ways through the matrix, memorising the best routes to the person they wanted to reach. Often this simply involved talking face to face: avoiding new technology altogether. A common assumption is that there's vastly more communication happening now than even a few years back – and that technology is the major culprit. Writer and commentator Richard Donkin expresses a typical view:

'When everyone was given the chance to send emails, the messages multiplied in their millions. The desk was under siege. The first thing to suffer under this deluge of information was work itself ... this wasn't information but information pollution. Unsifted, unregulated information was gumming up our brains ... The information revolution has buried the message. The message, any message, has become a tiny insignificant voice in the cacophony of communications, an email maelstrom. Work? Chance would

*be a fine thing.'*¹⁰⁰

Up to a point. If people were lost in a storm of communication and information overload, email tended to be the main culprit.

'You come in, in the morning, and your screen is red with emails that are unread and you can't keep up.'

Partner, Consultco

Among other things, email is both an information and a communication tool, which potentially doubles the trouble it can cause. But overall, we found much less email and information overload than we were expecting. Staff at Councilco and Researchco, for example, thought 20-25 emails received per day was 'a lot' – with 30 approaching the bounds of what is acceptable. The highly skilled professionals at Consultco took a surprisingly similar view, feeling 30-40 emails per day was 'excessive email'. Workers in the call centre at Financeco had restricted access to email while 'on the phones'. Whilst every employee had email addresses, these were mainly used for internal communication such as team announcements or product-relevant information. Private email was actively discouraged.

These findings reflect other research. A Pew Institute study found that 60% of Americans who use email at work receive 10 or fewer messages on an average day.

Only 6% receive more than 50.

That group often spends two hours or more daily on email, often beyond four.

And among those 'power users' – mostly the better-off and better-educated, those in large corporations and those in professional/senior positions – only 11% say they feel overwhelmed by all the email.¹⁰¹ iSociety's own data suggests in the UK, only a quarter of those who use email at work send more than 50 messages a week. Half of those who use email at work send less than 10 messages a week.¹⁰²

Problem email comes from one of two sources. Unwanted email, or spam, is a growing problem for everyone. Reliable estimates suggest at least half of all email now sent is spam. Spam is a nuisance or worse. All the case studies devoted some time and effort to cutting it out. However, unwanted email also comes from friends, colleagues and clients. CC-ing, jokes or double-checking are politeness for one person, spam for another. But at a more basic level, there is no one best way to email. Personal preferences play a big part, and they can be very different.

Email is my little world, my work plan for the day, phone calls interrupt that ...

I even send myself email reminders.

Rebecca, Consultco

I have 91 emails in my Inbox, which is 91 failures.

Manager, Councilco ■

'I have 91 emails in my Inbox, which is 91 failures.'
Manager, Councilco

Saving labour or new labour? Tasks and tools

Email is my little world, my work plan for the day, phone calls interrupt that. . . I even send myself email reminders.

Rebecca, Consultco

Dealing with this complexity is not easy. Love it, loathe it or fear it, email dominates many modern workplaces. Even the mighty are not immune. Bill Gates gets email too:

'I'd say that of my time sitting in my office, that is, time outside of meetings, which is a couple of hours, two-thirds of that is sitting in email. Email is really my primary application, because that's where I'm getting notifications of new things, that's where I'm stirring up trouble by sending mail out to lots of different groups. So it's a fundamental application. And I think that's probably true for most knowledge workers, that the email is the one they sit in the most. Inside those emails they get spreadsheets, they get Word documents,

*they get PowerPoints, so they navigate out to those things, but the centre is email.'*⁴⁰³

Email is unique in blurring the distinctions between information and communication, between public and private. It merges the I and the C in ICT; it is forward-looking and backward-facing. Email acts as an electronic filing cabinet, and as a device to store conversations to carry on later. It also overlays personal material with official communiqués. It allows its users to work from home and to home at work. Through the cc line and mailing lists, it helps co-ordinate formal teams, informal groups and communities of interest. It is a social medium and a technical tool.

The virtues of email can quickly become vices. Email provides a space for 'controlling' the day, but is one into which others can trespass to disrupt by requesting help, delegating task or issuing commands. It's no surprise that those who do suffer from information overload tend to see it as an email problem.¹⁰⁴ Excess or incorrect mailing is now taken very seriously indeed.

Email is also a highly relational medium. Who sent what, how they included me in the communication and who else was included is vital in reading the mail. Cutting through junk, even defining the junk and managing the asymmetry is key: 'Do I owe or am I owed a reply?' ■

Saving labour or new labour? Tasks and tools

Even a constant inbox ‘trimmer’ like Rebecca can find that their workflow is unhinged by such an inbox influx. However, email is a positive too. For some a crowded inbox is a valuable place, a ‘temporary holding pattern for ideas and inputs which they cannot yet categorise or even decide how they might use.’¹⁰⁵

6pm, Sunday. Trimming the inbox. Getting ahead of yourself before the week begins ...

Rebecca, Consultco

Can we get on top of our messages once and for all? Probably not. Email is also asynchronous: users always receive more than they send.¹⁰⁶

‘I sent 38 today – a quiet day, on Friday I sent 48’; says Mary at Designco. But by morning she arrives at work early to find 25 emails haunting her inbox.

So why all the fuss? There are two obvious reasons. First, there is a category error here. Most people don’t work in high-pressure, information-critical environments as found in sectors like professional services, government and the media. The ‘email overload’

debate is a classic example of circular communication: the chattering classes talking to themselves. Second, even for those who do work this way, overload is subjective. As technology becomes more pervasive at work, our tolerance thresholds increase – but we also become aware of other ways to get things done, and adapt behaviour accordingly. We adapt to a more communication-rich environment.

If there’s not more communication going on in the average workplace, there are far more ways to communicate. Deciding on the right way through has got a lot more complicated. Hardware and software is not as helpful as hoped: new tools all have their pluses and minuses. Put down on the page, it all sounds impossible. Luckily most people are pretty good at this kind of thing, consciously and unconsciously weighing up all of these factors and (generally) making the right decision. Everywhere we looked, media manipulation skills had become critical. Let’s review some of the main tactics we found people employing.

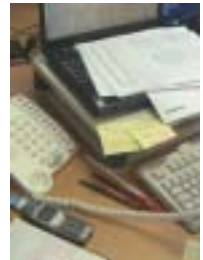
Talking

Much of the time, we found people communicating by avoiding new technology and sticking to firm favourites: short but repeated face to face communication and telephone calls. The complexity of information that often needs to be communicated means that this is the most efficient way to communicate:

In Logisticsco, when people need to communicate with each other they stand up and lean over to see the person they are speaking to on the other side of the dividers.

Chat is also the people’s choice: two-thirds of us would ‘rather speak to someone than email them.’¹⁰⁷ Sometimes both face to face and technology were used. Even if everyone has access to details on a system, asking others is often simply faster:

Even though everyone’s on Lotus, people will make general verbal requests for information – ‘do you know so and so’s telephone number?’ and a colleague will look it up for them on the system. ■



Saving labour or new labour? Tasks and tools

'When you're on holiday they call you, even if it's a personal mobile... I don't agree with that.'
 Laura, Consultco

But choice didn't always come into it. In the Researchco call centre – where staff did not have email – communication was generally verbal or through physical gestures, often very subtle – a raised voice on the phone signal others over, or arm movements and raised eyebrows.

Without the privacy of electronic communication, staff would also use a code phrase to signal to each other that they wanted to chat privately, face to face or on internal phones.

People also preferred voice when particular things needed to be said. The immediacy and richness of conversation is useful to build a work relationship – or to end it. In Researchco, we found a manager picking up the phone to tick off a tardy supplier, direct. Lawco's solicitors placed great stress on the 'personal touch' in dealing with new and existing clients, which meant sticking to phone and face to face and communicating with clients via email when requested.

Finishing

A good deal of communication needs to be fine-tuned for the needs of the particular person or group being talked

to – both for clients and colleagues. Our informants all had a mental directory of the best ways to get in touch with team members, managers and others in their immediate network. If they couldn't get through on the selection chosen, there was trouble:

There is general frustration when people cannot be contacted in ways in which it is expected that they should. [In Logisticsco] Jane has been emailing someone all day and has contacted him several times but he has not responded to her questions. Instead he has just sent her some emails with lots of things for her to do in them. She is finding this very frustrating. 'All I've done today is do his bloody emails!'

Converting

Reaching people often means converting from one format to another, combining media, or both. The affordances of various technologies, personal preferences and clout determine the exact combination. For example, a general preference for voice communication also leads workers to substitute and complement one medium with another. This is especially

the case where one medium is unsuitable for conveying all necessary detail and establishing agreement.

In other cases the conversion between formats is a way of recording information, communicating it and giving staff a visible reminder of it. Preferences here are personal and often eccentric. At Designco, for example, an automatic system created email from voicemail delivered direct to the recipient's inbox.

Setting boundaries

New technology also increases the ability – and the need – to cut yourself off from communication. Setting and maintaining boundaries is particularly important for those working at home or on the move.¹⁰⁹ Those with these new tools – particularly mobile technology – find them double-edged. The same things that enable people to work from anywhere also allow others to reach them everywhere.

'When you're on holiday they call you, even if it's a personal mobile... I don't agree with that.'

Laura, Consultco ■

Saving labour or new labour? Tasks and tools

Anecdotal evidence suggests many mobile professionals in the US use the tools of the trade to keep in touch with spouses, children and friends while at work, on the move or away from home. In Consultco, we found less of this than we were expecting. Informants suggested that US staff spent much longer at work, and needed to blur boundaries. At the same time, more US homes are equipped with the necessary gear. Both of these factors drove people to create the space for homing at work.

Summary

The original hopes that ICT would reduce workload are crumbling under the weight of our common experience. Technology can easily create as much work as it saves, even when people have what they need. Even optimists concede the benefits of ICT aren't all one way:

*'You produce more, because there's less time needed to wait for information ... it's a lot less convoluted to do basic stuff. You do work harder, but there's less frustration.'*¹¹⁰

A less optimistic – and perhaps more realistic – view is that setting up, learning,

managing and maintaining our new tools gives people a lot to do before they can get on with 'work'. Schwarz et al suggest that adept use of technology has become a job in itself. 'Technology work' includes keeping up with changing standards, overcoming the shortcomings of current offerings, managing professional networks and project teams, as well as information and communications management.¹¹¹

However, from this research it's easy to see how pervasive technology work has become. It's clear these tools and techniques complicate as much as they liberate. New technology offers more choice or more constraints, but always, more complexity.

This is partly because technology itself is often less useful than it seems. Communication at work is becoming ever more complex and increasingly requires all our skills as social animals to hop between media, to select the right tool for the task at hand. Information storage and management is much more problematic. As knowledge management systems attempt to handle more complex

information, holes are beginning to appear – holes plugged by people and their personal strategies. Firms need to worry about this. Data holes are black holes, as far as they are concerned. ■

Chapter 6

How does it feel? Attitudes and culture

What people do reflects what they think. This chapter examines basic knowledge of, and attitudes towards technology at work. Once again, technology, individual preference and social practice are bound up together.¹¹²

For many people, work is completely intertwined with technology use. But the majority aren't that knowledgeable about the technology they use, or that interested in it. Looking across the organisation, the story changes. Attitudes are, of course, linked to the job one does. Attitudes are also linked to the position and power in the firm. Technology is beginning to shape job descriptions for individuals and for organisations. Individually, these changes may be small. Collectively, technology in the workplace is beginning to change the social weather¹¹³ in the UK.

It's how I feel

How people feel about technology is, in part, a reflection of how competent they are with it. More than a decade after the arrival of PCs in the workplace, many Britons still seem less than au fait with these new devices. Some staff in Councilco asked our researcher how to attach a file to an email. They are not alone. A recent survey suggested one in seven office workers have trouble turning their computers on and off. Of those who get past this initial hurdle, a fifth admit to difficulties printing, and a quarter find spreadsheets taxing.¹¹⁴

Some of these depressing results can be explained by poor training and

technical support. Employers expecting skills to emerge out of nowhere and IT staff speaking another language have much to answer for (see next chapters).

There's also a demographic aspect to this lack of expertise. Those not growing up with new technology have had to adapt to it on the fly and are likely to lack any basic understanding. One industry figure spoke of a 'lost generation' who went through the education system without any formal IT training.¹¹⁵ Many of these people are now in middle or senior management positions.

However, the attitudes we encountered are more complex than this, and often suggested a basic lack of interest in the **▶**

How does it feel? Attitudes and culture

technology used. The vast majority of the people we talked to didn't feel the need to know or care about how things work under the skin. Practical knowledge of how to perform tasks to some level of efficiency is enough for most. Staff at Researchco, to take an example, seemed perfectly happy knowing just enough to do the job at hand, and no more. Some of our informants were actively averse to ICT. Others simply raged against the machine:

Mid afternoon in Logisticsco, Mary's having a conversation with her laptop and a spreadsheet that is causing her trouble. 'I just did save it you stupid thing' she says, then turning to the researcher

and muttering under her breath, 'I hate computers.' 'Right, I'll try again...'

A larger group was essentially pragmatic, seeing hardware and software as tools that could help them get work done, nothing more. A senior IT manager noted that: *reliability* 'is a killer factor. If something keels over, particularly if it keels over at crucial times, people quickly get disenchanting with it and throw it in the corner.'¹⁷

Technology's perceived usefulness is one thing shaping pragmatism. But other aspects of work also influence individual attitudes towards technology. Position in the firm, work organisation and corporate culture, for example, can all play a big role.

Kirsty works at one of the site offices and is the officer for one of Logisticsco's clients... She is incredibly adept at using the systems that she works on all day but does not see the technologies as something that she can have any kind of a stake in or use for her own benefit... She conceptualises her position in the company as low down the ladder. I ask if she has a company mobile and, surprised, she tells me that no, only the big managers have them. This in spite of the fact that people in head office who have a very similar role to hers do have access to mobile phones... This wariness of IT reflects the more general wariness that this office had of management and their activities. ■

How does it feel? Attitudes and culture

Sitting in front of a screen all day is unlikely to endear someone to their machine... Technology alone can't make a bad or boring job better.

Here, a whole set of factors influence Kirsty's actual and perceived degree of control over the hardware, software and systems she uses. Work intensity and job sovereignty can amplify this. For many of those low down in company hierarchies, attitudes to technology can reflect – among other things – their place in the organisation and the extent to which they felt exploited.

Technology = work

For many frontline or back-office staff, pragmatic or aversive behaviour around technology was closely linked to routine tasks, low work autonomy and an awareness of a 'low' position in the organisation. These people drew a clear distinction between work and home, with use of technology being one of the main markers of where work began and ended – and in stark contrast to the usual work-life balance rhetoric, which sees ICT as enabling work to happen whenever, wherever.

These informants were very clear they wanted work – and computers – to stay in the workplace. They made a clear association between using technology and being at work. Only one person at Researchco, for example, had a computer at home (they had previously been self-employed). If people there wanted to use a PC, they went into the office to do so – even at weekends. Similarly, staff at Councilco had no interest in using

technology to work outside the 9-5. One informant mentioned he might take 'reading matter' out of the office, but nothing requiring a PC.

The lesson here is clear. Sitting in front of a screen all day is unlikely to endear someone to their machine – particularly if they have little say over their work and how it's done. Technology alone can't make a bad or boring job better. The interesting side-effect then seems to be that if we associate technology with work, we're probably less likely to use it for work avoidance. Gossip, time-wasting or 'homing at work' are all well-known, staple ingredients of working life, particularly in offices.¹¹⁸ Email and the web are often seen as enforcing these behaviours, even leading to a number of managers deciding that certain staff didn't 'need' internet access for fear of 'online slacking'. In the workplaces where staff did have access to both, however, we found much less of this kind of behaviour than we had expected. Time-wasting was mainly restricted to sending round joke emails. Of course, homing at work needs to stay hidden, and this is likely to explain much of our findings. But other factors also seemed to play a part. Staff in Consultco, who had the means, seemed to lack the time. Work intensity was such that we observed no 'idle' use of email or the web, apart from a little Hotmail checking. In other firms,

people were worried about surveillance.

Kirsty knows that she cannot access certain websites, such as Hotmail or Yahoo email accounts, but is worried about what might happen if she attempts to access non work-related sites during her lunch hour. She tells me that she wants to buy a wedding present for a friend from Debenhams and her friend told her she can do it online. However the only internet access she has is at work and she is worried she might be 'caught': It is clear that she is unaware of the kinds of controls that might be in place, and this confusion leads her to self-regulate in circumstances when it is unlikely anyone would care.

For all of these reasons, enthusiasm, experimentation and play were limited. Unsurprisingly, the enthusiasts we found were in the tech sector itself. At Designco, a firm whose business is technology, many but by no means all workers were highly competent. Staff wanted to understand and have mastery over their hardware and software. A senior employee at one of the UK's largest software houses told a similar story: even those who aren't programmers are quickly drawn into the firm's distinctive culture.¹¹⁹ ■

How does it feel? Attitudes and culture

Personalising and domesticating

Two areas emerged where people were happy to play and experiment with technology. The first is personalisation. Where it's allowed – and sometimes where it's not – personalisation of the environment is a common feature of working life.¹²⁰ The same proved true of technology. People might be worried or indifferent about what goes on under the bonnet, but they're happy to re-spray the car. Desks, computers and phones in most of the places we visited were decorated and customised with a mixture of personal and practical objects. The HR team in Logisticsco are typical.

These machines are all highly personalised, with soft toys, messages from people, postcards and little models. They use brightly coloured post-it notes which are stuck around the monitor. The other desk paraphernalia includes an in-tray, a pending tray and filing tray. Gemma, whose desk I am sat at, has various bits and pieces on her desk including a filing cabinet shaped box with a digital clock in the front, a desk tidy, pens, a free mousemat from a technical recruitment specialist and some files. On the edge of the desk are some organisational diagrams for each of the sectors that they deal with, with the different people's names on that they might need to contact. She has a sign on her desk that reads, 'I thrive on chaos'.

As with desks, so with desktops. Most staff in Councilco, Researchco and Lawco had personalised their computer wallpaper, screensavers and screen settings, sometimes with images and programmes downloaded from the net. Those using email tended to set up a personal email signature, often with distinctive colours and fonts.

In Logisticsco, a firm often connected to clients' networks, there were heavy restrictions in place on downloading and personalisation: screens were plain, or with company branded images.

The second area where we found people happy – or ready – to mess with technology was in developing rituals, routines and workarounds to suit personal preferences, or to deal with shortcomings in the technology itself. ICT rarely comes with a 'rule' book in terms of practical sets of procedures for their use in practical means. For the most part what we observed was invention or improvisation. Workers were adapting the technology to get work done. A key theme in this research is how much of what's presented as a technology 'solution' still leaves many problems unsolved. Some managers and many IT staff appear unaware of this more complicated, messy reality, and so it's left to staff to find a way through. Getting by is a key feature of how many of people use ICT at work.

Simon, at Consultco, works on designs for marketing materials to be sent out. He works with the in-house and an outsourced design agency. They send through proofs in PDF (Adobe Acrobat format), but he doesn't have the ability to correct or amend these on screen. He has to print out the document, highlight the errors and then list them in an email.

Often individuals need to bridge gaps between applications or software which had been left open. Despite the fact that systems integration is at the heart of the ICT sales pitch, individuals are the ones on whom integration often depends.

At a warehouse site of Logisticsco, Keith uses a series of databases, stock management systems, network transport systems. Keith had moved beyond his job description to develop databases and spreadsheets that would help him work more efficiently and reduce the amount of 'monotonous work' that he has to carry out. His colleague Don also has to work across systems that are not fully integrated. The systems he works with also interface with those of client companies. Others need to make a similar leap between systems. Someone asks him to complete a 'manoeuvre' for them, and he says it will take an hour or so. He actually does it in 3 or 4 minutes using a couple of little tweaks he's developed. That's some more time he's bought for himself to get on with other tasks. ■



How does it feel? Attitudes and culture

In many instances we found clear routines that develop around work with technologies. Routines often need to be repeated, and so may come to develop elements of ritual.

If, as we have suggested before, technology is making work more stressful and at times more monotonous we should not be surprised to see workers developing workarounds that enable them to get their work done more quickly or more enjoyably. In many instances we found clear routines that develop around work with technologies. Routines often need to be repeated, and so may come to develop elements of ritual:

At Designco, Jane nearly always fills the 'To' field in after she's written the email. Asked about this she explains that it prevents a half-written email being sent accidentally. Pocket diaries are synced with the calendar system on the network first thing by Rebecca and her partner in the Consultco team. It puts them at ease, ensures no surprises occur and settles them into the flow of the day.

We found that most of these workarounds and strategies are below the radar. Presumably, many workers regard lack of management interest and attention as a good thing. But attention to these everyday responses to working with technology can provide us with important insights into ways to develop tools and systems that fit more intuitively with needs. It can highlight system limitations and problems that require real solutions.

Groupthink

At work, no one is an island. Even those spending time working solo are often organised into formal teams. People also tend to organise themselves into informal groups, based around interest, specialism, profession – or simply because they get on with each other. Often, these cut across formal groupings. Here, as elsewhere, technology is the enabler, reflecting and reinforcing the way things are.

How does use of technology bind people together? Technology directly mirrors a collection of people. Email lists are one good example, used by many firms to communicate with teams, and by interest groups to communicate with each other. Company intranets are often divided into sections run for, and sometimes by different parts of an organisation. At street level, joke emails, images and gossip are passed round close colleagues. In organisations where not much verbal chat goes on, electronic communication can be a discreet, less disruptive way to keep the conversation going.¹²¹

We found a number of instances where use (or avoidance) of ICT reflected issues of group professional identity. Libraries are in the midst of extensive change, as they move from simply storing books to becoming information

service centres, offering music, video and internet access. These shifts had big repercussions for the librarians in Councilco.

The need to learn and use new sets of electronic media, filing and cataloguing systems was resented by some because *'this is not what librarians do'*. There were moves to separate 'the professionals' – the librarians – from 'para-professionals', subordinate staff who would handle the technology. ICT was seen as a levelling force, chipping away at what people expect they should be doing.

In Lawco, while PCs were used by solicitors for a number of key tasks, the keyboard was usually pushed to the back of the desk to make way for the legal file and the papers for a case the solicitors were working on. As we have seen, this reflected the task in hand; it also appeared to reflect a sense of professional identity. This was tied to a clear division of labour: most of the typing was done by (non-fee earning) secretaries, most of the decision-making and wording by (fee earning) solicitors. Computerisation was beginning to complicate the picture: one partner was using digital dictation software; the firm has also brought in electronic facilities for some case searches, and is considering using an independent agent for all searches. ■

How does it feel? Attitudes and culture

In Mandarinco, professional identity was defined even more minutely. There was a clear 'cultural hierarchy' of skills and specialisms, with different categories of staff sticking to particular programmes: analysts crunched numbers and used bespoke applications, leaving support staff to work general office software.

Occupational communities

Occupational communities combine elements of group and team. A collection of people working in the same field, but often spanning a number of firms, they maintain extensive formal and informal links, enabling them to swap information and ideas. Occupational communities also tend to have both distinctive cultures and distinctive ways of working.

The web developers at Designco formed a clear occupational community. As a team, they provided a discrete set of skills and a clear role in the creation of websites: they sat together and made up one of the key skill groups in the business. Additionally, they operated as a group, through their methods of working, their co-creation of skills and knowledge and their overall sense of cohesiveness:

Jim is a website developer, or a web dev, the standard term used to describe the programmers who construct the interface of a website what the user of a site interacts with and uses to access the information that the web site holds.

He used to work at a smaller company before moving to Designco. It was at this company that he developed his particular skill set, specifically a far reaching understanding of Macs. He is therefore the de facto Apple support contact in the company, a position underscored when it was announced that a new Tech Support staff member would be tasked to learn all he could from Jim... The general atmosphere in his room swings from excitement to silent concentration, feverish individual activity to group collaboration. At any one time the web dev team is probably working on a range of different projects or sites... When he's asked to make some changes to some code and realises that he's on uncertain ground – someone else was responsible for the original code – he asks someone across the room. The explanation fails him and the colleague comes over. Others join the conversation and together the offending lines of code are expunged. On another occasion, Jim reads a large volume on XML, noting that he cannot know the whole of his field, and even if he did he'd forgot it by the time he got round to using it. He spends an hour with the book – interrupted occasionally with emails, IM and conversation with fellow workers – because he believes the knowledge he's creating will outlive the project it's required for.

Collective learning is a key feature of groups. In this extreme example of web developers this mode of learning underscores their working identity, but finding help in groups is the modus operandi for all workers using ICTs. Groups represent rich resources of tacit knowledge that can be applied contextually to other people's problems or issues. Group knowledge, with its stress on context, recognition of the understanding or ability of the individual in question and what they are trying to achieve with their tool, is a powerful resource. The more eyeballs the better, as a web developer once noted.

Status and hierarchy

Technology unifies: it also divides. Different technologies are being used by different groups as symbols of difference. In Councilco, staff in the libraries and information service division envied those in another division for having laptop computers, even though they were perceived to have little knowledge of ICT: 'useless equipment for idiots'. Library staff felt provision of ICT reflected their place in the corporate hierarchy. Out of sight of the town hall, in their minds they were relegated to the periphery of the organisation. ▀



How does it feel? Attitudes and culture

A study of a Californian hi-tech research firm found three broad emailing styles corresponding to different positions in the firm.

In Consultco, consultants and frontline staff were provided with a range of mobile equipment that back office staff were perceived not to need, since they 'didn't leave the office'. Here, as in many other cases, the distinctions between seniority, status and need have become blurred. One senior manager described how the firm had set up laptop, mobile, mobile email client, home PC and a broadband link before day one in the job: *'Seniority drives this, let's not kid ourselves.'*¹²²

But, at the same time, need is a factor. Many companies clearly consider senior people's time too valuable to waste on waiting for equipment to be ready. These senior privileges are often also extended to IT support. A number of financial and professional services firms provide separate, high quality executive support services, who personally fix up and

maintain senior managers and executives – the electronic equivalent of turning left on an aeroplane.

While access to ICT reflects status, its use can also reinforce it. Even in companies which actively designed out hierarchy, technology finds a way of expressing actual existing hierarchy. A study of a Californian hi-tech research firm found three broad emailing styles corresponding to different positions in the firm. Even though very little formal hierarchy existed, use of technology provided a useful way of signifying status informally. Senior staff tended to send short, terse messages, often with poor spelling and grammar – a consequence of a busy and important job, perhaps, but also a way of expressing it. At the other end of the scale, lab workers sent mostly joke mails round friends. Middle managers

tended to send long jargon-rich messages, often providing over-complex answers to simple questions. They were also most likely to use the 'cc' line. Both behaviours display a kind of conspicuous dynamism.¹²³ More accustomed users in our study took things even further. They seemed highly aware that their relationships to an email, and hence to how they should act on it, depended on where they are on the mail: the 'to', 'cc' or 'bcc' line. Some ignored email they received into which they had been 'cc-ed'; others read cc from mail from significant others, usually managers, as 'add to my list of things to do'. Staff at Consultco, for example, typically studied the order of names on the 'to' and 'cc' lines to determine how much attention they needed to pay to the content. Cc-ing was variously known as 'colleague commandeering' or 'consensus construction' ■

How does it feel? Attitudes and culture

Social historian Raymond Williams argued that: 'a main characteristic of our society is a willed coexistence of very new technology and very old social forms'¹²⁴ Sometimes the form of the first closely reflects the shape of the second. In Consultco, for example, the use of universal ICT systems and top-down implementation created tensions in the highly devolved organisational structure.

Lawco, with its fledging network, presented perhaps the most dramatic example. A simple configuration of interconnected machines, the file structure was a mirror image of what existed in the filing cabinet, and the network was growing in tandem with the filing system. One was not supplanting the other, but rather they were bedding down on top of each other. This exemplifies the way most organisations actually use

ICT: a co-evolution of new technology and existing features of the firm.

Summary

Having and using hardware, software and systems plays a role in reflecting and reinforcing individual preferences, corporate norms, team structures, organisational and group cultures. Technology acts as marker of status, hierarchy or profession: and as a marker between work and home. Avoidance can be as powerful a symbol as embrace. Many things drive people to default to other ways of doing things.

Attitudes to ICT have implications for the quality of technology strategy, management and implementation, something we'll encounter in the next chapter. If indifference is the order of the day, it's not surprising we can also find senior people, without much

interest or skills in technology, running the show. ■



Chapter 7

On the top floor: management and strategy

This chapter concentrates on the people, structures and forces which shape our working lives: organisations and managers. Specifically, it examines the realities (as opposed to the theory) of networked organisations, employee control and surveillance.

As we know, the macro data do not tell a very happy story here. UK organisations do not seem to have gained much from the considerable ICT investment made over the past 15 years or so. Of course, the fruits of innovation can take time to ripen. Of course, the fruits of innovation can take time to ripen. It is not easy to ensure that they do. However, we found many organisations struggling to move beyond this first stage. Firms and their management are still grappling with the implications of ICT.

Management attitudes

A number of forces and factors are driving organisations to find ways of doing more, doing it better and doing it for less. Better use of technology is seen as a key part of such moves.

*'Once, the IT organisation could be run effectively as a support function. Today, however, most new IT applications span businesses and functions... Companies that aim to derive full value from their investment in IT must therefore alter their business processes and understand how IT can be used to foster improvements and competitive advantage.'*²⁵

So what are the UK's managers making of this? How do they see technology

helping them and their organisations perform better? From the conversations we had, a number of motivations emerged. Managers were engaged in the right areas, even if in some cases thinking was vague.

We saw little evidence that boardroom knowledge of, and skills with, ICT differed from the shop floor. In this, if in nothing else, bosses are just like their employees. However, it is management that feel the pressures to procure and implement ICT. This pressure comes from a range of directions.

For private sector organisations (the majority of the sample) competitive contexts were the most pressing. ■

On the top floor: management and strategy

International operations and increased international or domestic competition were centre of the management radar. This translated into decisions about technology. Senior managers at Consultco were testing BlackBerry handheld computers for mobile email with some staff, explaining that: 'if the competition make their staff work 24/7, we will have to follow'.

The legislative environment is forcing change. For example, the European Working Time Directive requires recording of time worked and various firms had implemented systems to this end.

There are particular pressures in the public sector. In Councilco, we found managers working with high-level platform strategies to improve public service delivery, and specific programmes to increase quantity and quality of electronic service delivery. Delivering outside services differently meant doing things differently inside, with big implications for the way staff worked and the tools they used. In Mandarinco, by contrast, the shape of external relationships was basically set, and the

main thing on managers' minds was finding ways to improve internal work processes – to help staff work smarter.

Across the larger organisations in both sectors, a common set of drivers was a perceived need to be 'more flexible', 'more responsive' and 'more agile' – one internal slogan at Financeco was 'innovation driven by focus'. This vague rhetoric reflected the overlapping set of challenges many faced. Such thinking is now as common in the public sector as the private. In central and local government, as well as other areas of the welfare state, citizens and businesses both fall into the category of 'customer'.¹²⁶ Management regard technology as central to attempts to better serve the customer.

How did these sentiments connect to thinking about technology? In many cases, the generic management-speak hid some much clearer thinking about how technology could help. Generally speaking, some organisations and managers were more confident with the field and more proactive: we can label their behaviour as strategic.

For others, adoption and use was more reactive, or tactical.

In Financeco, managers had spent considerable time, money and effort developing a bespoke CRM system. The system was a basic part of the company's operational strategy, particularly in the firm's call centres where it was the main tool used by staff when interacting with customers. The firm was also considering moving some of its back office functions entirely offshore, essentially making them virtual support systems connected by ICT. In Councilco, senior staff had recently developed a series of strategies – to improve general service delivery, and to meet specific central government directives to develop ways to deliver all services online by 2005.

In practice, this meant finding ways to give citizens a choice of ways to contact and interact with the Council, such as a dedicated multi-media contact centre for environmental services, and eventually all services. At the same time, hardware, software and systems were being rolled out to improve the performance of staff inside the organisation. ▀

If the competition make their staff work 24/7, we will have to follow.'

On the top floor: management and strategy

'It's that type of firm: embedded in the fabric of the business is an understanding of technology that is light years ahead of other sectors.'

In contrast, managers at Researchco were mainly concerned with tactical thinking: reducing outsourcing costs and minimising short-term expense. These could often point in different directions. On the one hand, the firm was keen to develop its own computerised call centre to replace the current paper-heavy system. On the other, bosses were regretting having developed home-made finance systems based on Excel and not plumping for industry standard packages. Several thousand pounds were saved at the time, but they were now living to regret not spending the money.

These contrasting management approaches reflect several factors. First, size: an organisation's capacity for change has much to do with the resources it can throw around. Big players, with earmarked budgets and dedicated IT departments are very different from smaller firms where an individual is responsible for technical decision making (as at Researchco). So size and resources mean that smaller organisations rely on reactive, tactical thinking about technology.¹²⁷

Second, sector: in the US, productivity gains from ICT appear to be concentrated in hi-tech industry. This partly reflects the demand on those sectors for products and services elsewhere in the economy, but may also reflect good internal understanding about how best to use

new technology.¹²⁸ One senior industry source suggested that organisational know-how was inherent in firms where technology is the business:

*'It's that type of firm: embedded in the fabric of the business is an understanding of technology that is light years ahead of other sectors.'*¹²⁹

There is much in this. We observed very different levels of mainstream management engagement in thinking about ICT in, for example, Designco (a new media company), Financeco (which relied on ICT to win and keep business) and Lawco (where ICT is treated as one of many office tools). Levels of organisational know-how were also reflected in managers' personal attitudes towards new technology. Some senior staff demonstrated a sophisticated understanding of ICT, specifically that its uses and benefits were not a given:

'You know, technology is a tool. It is there to be used and abused, it needs hammering. It needs developing. It is what I can get out of it, rather than what it can do for me.'
IT Manager, Logisticsco

Other senior staff had developed a sharp sense of how ICT could, or could not, add value. Staff in Financeco were clear that general arguments about 'productivity' wouldn't wash in a firm with so many distinct functions. In Consultco, one senior employee

described his incredulous reaction to a 'techno-enthusiast' colleague's attempt to sell-in a new system:

'Efficiency gains perhaps, but revenue increases? I mean, I said to him ...'

One senior IT manager in the public sector was critical about Whitehall plans for e-government:

'There's no business case for e-enabling absolutely every service that we have got. There is no developed market for a number of them. There is certainly no sustainability in some of the approaches... we're trying to do here what people tell us is important, and giving them real choices, while at the same time improving our own internal operational efficiency. That will be our major thrust.'

Of course, IT directors should be in the know. By contrast, we found managers were often as unengaged with ICT as their staff. One executive summed up his personal approach as: 'trial and error, around a general commitment that this stuff works.' He was slightly more exacting when asked specifically about justifying expenditure:

*'It's important, up to a point. It's hard to say no to bright young people when they ask for something – when it's a cultural thing – but if they demanded something much more ambitious, like video phones, I'd want to see numbers.'*¹³⁰ ■

On the top floor: management and strategy

This relaxed attitude appears common. A KPMG survey of 200 senior board members of UK companies found around half did not know what their ICT budget was, and 80% did not know what cost savings they had achieved through their systems.¹³¹

E-denial may be partly a British problem: the average UK manager has far fewer qualifications than his or her counterpart in France, Germany, Japan and the US.¹³² It may also be a problem that eases with time. One senior manager suggested that: 'lots of 40 or 50-somethings can't even type – they're not that interested. The short run costs of switching the tools you use are too high.'

For those used to having a PA on hand to take dictation, a lot of new technology appears rather alien or frightening. Legions of silver surfers suggest that age is no barrier to engaging with ICT. However, those managers of a certain age – or any age – determined to avoid thinking about 'computers' may act as a barrier to their thinking about ICT in general – or using it in their organisations.

The danger in all of this is that naive or disengaged decision-makers will buy in to simplistic ways of thinking about technology; or rely on people espousing such views, either internal colleagues or external sellers or consultants. The general level of success experienced by the firms in our sample suggests that some managers had fallen into precisely these traps.

Networked enterprises

This is supposed to be the era of the 'networked enterprise', in which the traditional boundaries of the firm are becoming more porous – and in some cases, dissolving altogether – as contracting out, strategic alliances and outsourcing are becoming the norm. ICT is the engine of these new organisations. New technology also facilitates networks of professionals and freelancers between firms – interest groups and occupational communities.

As we saw in Chapter 2, this is precisely what has happened for some firms, but in general, networked enterprises are less widespread than commonly thought. Our research helps to explain why.

We found some networked structures that, at first sight, conform to expectations. Logisticsco was perhaps the only truly 'networked enterprise' in the sample – a company which acts to build bridges between other organisations, which are heavily networked into their operations and their ICT systems.

Others had taken on elements of the networked model. Financeco was planning to move its client data processing operation out of the UK. Web developers and network administrators at Designco formed a classic organisational community: the group maintained close links with other

technical people outside the firm, generally through email and IM. Consultco was more networked than it appeared from the outside: the firm was described to us as 'a series of family businesses under a global brand'. In most of the others, ICT provided platforms for linking functions and departments through knowledge management systems and human resource management systems.

However, being networked requires more than the implementation of technology. A lot of mundane (and more important) factors limit what can be done. Network structures aren't always appropriate, or even needed. And network tools do not always make the connections required. Networks are truly socio-technical – the gaps in the technology are bridged by people. For most of the firms we looked at, technology was only the first step in becoming genuinely networked.

Legacy was one major constraint: how the network had come about in the first place. Consultco and Logisticsco had both come about as the result of a series of mergers and acquisitions over the years. Even if organisations fuse, technology often doesn't. ▀

A KPMG survey of 200 senior board members of UK companies found around half did not know what their ICT budget was, and 80% did not know what cost savings they had achieved through their systems.

On the top floor: management and strategy



We found people in both firms wrestling with systems that were either incompatible or wouldn't work together as planned: programmes and machines meeting earlier or different versions of themselves.

Don tells me that there is a bit of a problem at the moment, not only with double entry, but with triple entry of data in HR. He finds that the same information is often entered independently in three places: on one of the HR systems, on the accounting system and in paper form. Don's perception is that the first thing they could get rid of is the replication of system information. In an ideal world, Don said, the systems would all interface perfectly and would update each other so that where ever a person changed something on one system it would be updated on the other. The site software is however often different once again and systems that were inherited from the past are still used but not fully integrated...

This kind of thing was a common problem in all of the organisations we visited: to the extent that *'the systems do*

not fit' is a given of working life. In most organisations we found individuals working to ensure that systems did fit. This involved developing specific knowledge of different systems and being resourceful. The ideal world that Don refers to is telling. There is an expectation, or hope even, for those who know better, that technology can provide a 'total solution'.

Security issues were a further big constraint on networked organisational forms – paradoxically, one generated by networked activity itself. One industry figure told us that *'security is too important to trust people with'*, and this extreme risk-aversion was reflected in a number of our case studies.¹³³ Logisticsco had a similar 'no downloads' policy, and a number of security mechanisms constraining both connectivity between the company and its clients, and what staff could do.

'A PC on our network might also be on someone else's network. So you can imagine that the security issues are quite immense. Because if you put a virus onto the network, you know, it's not just our network, so security is very strict. An

example: I went to BBC's website. I had heard a song on the radio in the morning and I wanted to see – you know how they put a list of songs up that they have played. I thought, I must have a quick look. I got to the BBC site, went to Radio One, and I can't get any further than that, because anything that has the ability to stream, is stopped on our network.'

Not everyone needs to be networked. Unlike many firms of similar size, Lawco, the small, local High Street solicitors had recently introduced broadband and an intranet. However, managers felt no pressing need to introduce further networking technologies to enable the web of relationships already in existence.

It was a network already held together by other means: the firm felt there was little sense in further computerising processes if clients, customers and suppliers were not doing the same. The scale benefits of ICT would only have been realised if everyone had begun using it. ■

On the top floor: management and strategy

As we have already seen, networked technology is not seamless. Just as holes in information management systems are plugged by people, gaps in networking technologies are bridged by employees themselves. We heard of one contractor in a major bank who plugged his laptop into the system and unintentionally introduced a virus into the company system. After this episode, the company considered screening everyone coming into the building for computer equipment and requiring them to check it in at the door.¹³⁴

As a result of all of this, many workers might not feel as networked as their bosses would expect. One senior executive confidentially described how his company has become 'much more networked' over the past couple of years; staff in the same firm pointed out that servers regularly crashed, making much work impossible. Managers at Councilco saw ICT as an essential tool in bringing geographically far-flung departments into the fold, and creating 'a more collegiate feel'. By connecting the information services in

the borough to a national intranet, rather than the local network, however, staff in libraries felt much more distant and cut off from the centre, not more connected.

Without a basic level of trust between parties, networked activity could exacerbate some of the tensions existing between employee and employer, notably the issue of controlling the activities of staff. The promise of networked working depends on people, but from the management perspective people require a degree of control. New technology promises myriad ways of monitoring, and thus, controlling employees or contractors. But as we will see, the theory and reality of control look very different.

Control and surveillance

1984 has come and gone, but its imagery remains. Pervasive monitoring through technology is a persistent fear for many staff. At work, employers now have the means to watch us constantly – if need be, through the very equipment we use in our jobs. If desired, management can even monitor the number of keystrokes per minute to check on how hard their

staff are working.¹³⁵ Chapter 2 highlighted a rise in management control mechanisms over the late 1990s. Forty per cent of firms in Britain now use electronic systems to keep a record of employees' work; 48% use such information to evaluate individuals' performance.¹³⁶ Control and surveillance have become key issues.

Why do this in the first place? For management, controlling workers may seem the most obvious way to make sure they actually work. Additionally, the firm may seek to control its own reputation and integrity, its security (from computer viruses, etc), its brand, its compliance with relevant legislation and regulations, and maintain appropriate relations with clients and suppliers. ICT both enables and (arguably) demands strong means of control by management.

How this control is understood and acted on on the shop floor is therefore critical. What are the limits of control, the stress points for individuals and organisations? Most of all, how helpful is ICT in all of this? ■

On the top floor: management and strategy

The first point to make is a simple, but important one. As a means of control technology is rarely used alone because technology alone is not sufficient to ensure control. On the ground, we found a variety of overlapping systems of control: technological, managerial, social/peer and individual/self-control.

A number of the organisations in the sample used technological control, through surveillance, maintaining systems integrity and limiting access to certain hardware and software. Councilco's contact centre had systems gathering very basic call data; Financeco's call centre systems gathered an enormous amount of quantitative and qualitative data through call logging and monitoring. Some calls were also monitored at Researchco, where call centre staff were also denied email and the web by working on paper-based systems; other staff had no access to webmail and IM. Logisticsco and some of the other sites did not allow downloads. Some of these policies were enforced through technical 'solutions', such as SurfControl software, which limits access to certain internet sites.

These policies were usually buttressed by managerial control mechanisms: explicit rules and protocols governing staff behaviour. Researchco and Councilco, for example, both had 'fair use' policies on the internet – in the first case, non-job-

specific surfing was restricted to lunchtimes only. Financeco call centre staff had no access to personal email or the web on shift, and were also denied mobile phones or personal effects.

Managerial control mechanisms reflect the culture of the organisation, and express the official boundaries of acceptable practice. Some codes were clearly authoritarian (Researchco and Financeco, although the latter was moving away from this), others more permissive and trusting (Designco and Councilco). At Councilco, for instance, heavy monitoring was not considered appropriate, with management of the contact centre seeing better ways of managing people.

Individual or self-control was also a key element in the mosaic of methods deployed by firms to maintain control over their staff. We found that 'rules' became less pronounced as we moved up the hierarchy in some organisations. Senior staff were more trusted, (despite no clear evidence that they should be). Levels of control reflect and reinforce positions in organisational hierarchy.

In generally permissive environments, such as Designco and Councilco, self-control is the most obvious mechanism being used to ensure the appropriate use of ICT. This covered both what people could do (surf, chat, work their own way) and what they were shielded from (spam, viruses). This was an implicit social

contract: freedoms from interference and monitoring, and freedoms to work without disruption from spam or viruses.

Do we have the technology?

In any case, using ICT to monitor and measure staff activity generally brings managers up against two big problems. First, technology gives managers too much information. Second, it gives them the wrong kind.

Work by Bain and others in Scottish call centres details the significant problems faced by management in sifting through numerical data, and interpreting recordings of calls.¹³⁷ The first is enormously time-consuming, the second inevitably subjective and open to challenge. Managers in the study had learnt these lessons. In general, the sheer volume of data being collected made monitoring nearly impossible, in real time or otherwise. Financeco had adopted a double-barreled approach. Evidence of serious misconduct, backed up by data lead to swift dismissal. Generally, though, the firm made efforts to treat employees as adults: ▀

On the top floor: management and strategy

'We don't adopt a big brother approach. It's completely against the culture that we are striving to achieve and against our values. And it's not just that. We don't believe that it's the right thing to do and you get much better engagement from people. Basically we strive to treat people on an adult-to-adult basis, that's the basis of our people contract, so the information that we're using is used for resource planning, management, than to monitor any individual.'

Financeco, Support Manager

An outcomes-based approach was already in place at Councilco. Management trusted staff to get on with their jobs and used the system to help improve work efficiency not for disciplinary purposes.

Everybody sits there thinking we sit here monitoring everyone's email, all day! If only we had the luxury of that time ... but we're not interested in that sort of way!

IT Director, Councilco

In general, the firms in our sample had moved from proactive to reactive monitoring: storing vast quantities of data that would then be mined when wrong-doing was suspected, creating archives and data trails to be used in the future. Technologies were used to support a data recording culture. ICT was used as a safety net or blind eye, a back-up for social control.

At Financeco, for example, calls were recorded and interactions with customers through the CRM system were logged. During research a worker was sacked, with the accusation that they had claimed closed calls (sales) that had in actual fact been quotations. The worker was also accused of hanging up on calls. The data trail provided was used to bolster the company's case. Interestingly, on the ground this was welcomed. Staff were concerned to remove 'bad eggs' from the workforce, not least because individual bonuses depended in part on collective performance.

For many staff, the uncertain sense that 'they' might know what was happening, or could do if they wanted to, was enough to enforce compliance. From the organisation's perspective knowledge – or lack of it – is power.

'I do not think we're blocked from any sites, are we?'

Consultant, Consultco

Resistance

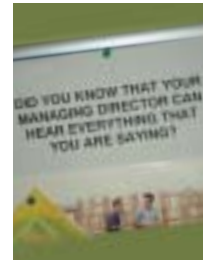
The existence of threats, actual or otherwise, is not always enough to get people to comply. For obvious reasons, we found little overt resistance on display. What opposition we did find was generally of two types. In a few cases, individuals were able to use personal expertise to carve out a comfort zone for themselves. Knowing more about the technology than the boss is always helpful.

Sometimes Keith [at Logisticsco] has to be quite devious and has to hide things that he knows so that he doesn't get taken advantage of. If someone asks for something and they ask how long it will take him to do, he will tell them he will get it to them in half an hour even though he knows it will only take him two minutes, or even just a few seconds to get sorted out. He does this in order to have greater control over his own work, as only he knows how to use the information according to the design of the system.

In environments characterised by self control, attempts to impose rules usually fell flat:

At Logisticsco, Alison, a sporadic user of the databases, is sending a document to a colleague by email 'We're not meant to do this, email documents', she notes, with a conspiratorial 'wink and a nudge' at the researcher, as if to say: 'Do they really expect me to tell him where it is on the network, by phone or email, so that he can find it himself?'

A manager at Consultco expressed surprise that people used their pocket diaries rather than the online appointment system: 'We issued a directive on this last year' ■



On the top floor: management and strategy

A similar contrast between management orders and actual behaviour is in evidence at Mandarinco:

'All calendars are accessible but nobody bothers to look at them. Everybody sends email or calls (in that order) to check availability instead. Even the Permanent Secretary's assistant did, hours after an email went out in his name to please use the calendars more.'

Summary

Mainstream management is often disconnected from, or uninterested in ICT – or both. First, many managers share the general lack of knowledge and interest in new technology. Personal disconnection translates into organisation structure,

with technology relegated to a back-office support function, and IT staff cut off from the mainstream.

Second, ICT is again less helpful than it seems. For a number of key management issues, technological tools turn out to be much less than the 'solution' they're commonly described as. Electronic surveillance and networking technologies can under-perform much as knowledge and information management systems do. Networks leave holes plugged by people. And technological control systems are no substitute for good management. General control over technology may be more effective than direct control through it. ■

Chapter 8

With a little help from my colleagues: learning and change

Organisations that stand the best chance of reaping the benefits of investment in ICT are those where people have the right knowledge and skills.

We know that the skills demanded and required at work have risen over the past decade: the spread of technology into workplaces is one of the things driving this (Chapter 2). So, how have these skill increases come about? What role, if any, do managers play in helping staff acquire these skills? Who has the burden of upskilling fallen on? In general, it appears to have fallen on workers. With a few exceptions, staff do not have the formal training they need. Most learn informally from colleagues. This can be helpful, and do more than simply plug gaps in knowledge. However, a greater provision of formal training will undoubtedly lead to better provision of informal, on-the-job training.

A similar dynamic characterises the implementation of new ICT systems. The key to success is striking the right balance between a clear vision of what the new kit is supposed to do, and devolving decisions and rollout to department or team level.

Learning about technology

In general, we encountered low levels of formal training across the sample organisations. The training described by informants was often too cursory, too impersonal and not thorough enough to make much of a difference. At times training was merely a form of communication. Desk drops informing people of infrastructure or application

implementations were a standard device used at Consultco. Most employees regarded these as entirely ineffectual. In another case, training on the issue of money laundering followed a format replicated for ICTs: *'Training consists of watching the video, reading a policy statement and successfully completing the full CBT (Computer Based Training) package'* reads the letter sent to a consultant.

There were exceptions to this where organisations recognised need and put programmes in place to meet it. ■

With a little help from my colleagues: learning and change



At Financeco, we found that a six-week period was set aside for new recruits to learn how to use the company's CRM system and learn about the company's products. This represented a significant investment, and given average retention levels in the call or contact centre sector, a significant gamble too. Mandarinco's management take the importance of technology skills very seriously: in the department we visited, all incoming staff get a full audit of ICT skills and extensive training is provided where required.

At the other end of the scale, we found that staff in Researchco claimed never to have had any formal training of any kind, either in the company or in any other job they'd done. The IT director challenged their claims. However, his opinion of their abilities with technology remained low.

A laissez faire approach to training was not uncommon. Quite often companies either assumed knowledge or relied on staff to pick up the required skills by osmosis. A natural ability with ICT was assumed which would not be the case with other technologies or machines. Some senior staff saw this as a cause for concern and were taking steps to deal with it:

'We wouldn't let people loose on other kinds of machinery without training them... Untrained people on accounting systems could be just as dangerous. ... IT skills training is pretty laissez faire and

relaxed, which is a real issue for me. A couple of years ago we defined a whole load of core competencies for people which in my view need to be compulsory, they need to be tested against and they need to be tested at the point of interview for people who come in to the authority: but it's voluntary, at the moment.'

IT Director, Councilco

Given the general paucity of formal training, it was not surprising that we found so much informal learning going on. Much of what people know about ICT comes from all around – not from above. Personal contact and professional co-operation among individuals and teams is a vital component of everyday working life when it comes to getting things done. As with completing tasks, so with learning the skills required to perform the task. In some cases, and in some firms, this seems to work very well indeed. Learning the manual is not always practical: communities of local experts may be a better solution.

At Designco, a company defined by its use of ICT, training on the software applications used for tasks such as design and HTML authoring was not provided in-house. As Mary, an employee suggested, this was because many staff are autodidacts. They are also expected to have a high degree of knowledge and in certain fields, such as design, to have

acquired skills through formal education. Culturally, it was clear that people were happy to share expertise and techniques: both to avoid having to perform the task themselves and to spread the knowledge.

'Have we got a scanner?' Mary is asked by someone standing by her desk. 'Yes' she replies, 'but do not use Photoshop, use QuickScan or whatever it is, otherwise it will crash.'

As the company had introduced resource management and time allocation systems, people with explicit skills might be pulled off a 'resourced job' in order to perform a task for a colleague. The identity of many 'haute-tech' workers is founded on mutual co-operation and co-production of skills and knowledge. They train each other. The trained train others.

Outside the high-tech sector, where the general level of ICT expertise is lower, it is much harder to see how this can work in the long term. A good deal of the informal learning we observed was fairly limited. A great deal of personalisation went on in a number of the case studies: typically, people learnt about new screensavers or wallpaper from colleagues. Learning the minutiae of information management and communication tactics also generally took place at ground level. ■



With a little help from my colleagues: learning and change

[At Logisticsco] Susan calls across the desk, 'Are you printing any more of those off Jane? Which section do I put it into on the computer?' Jane replies, 'Put it into the letters/emails folder.' This is how people learn how to organise their information in the same way as others.

In some cases, however, informal learning was implicitly or explicitly discouraged by management. In Logisticsco, we found far more improvisation and informal learning in the offices rather than the warehouse. This partly reflects the technologies made available, but also, management regimes of authority (in the second) and relative freedom (in the first).

Looked at this way, general control over technology may be more effective than control through it. Checking the flow of knowledge and skills is one way of doing this; closing off opportunities for informal learning is another. Both practices have other rationales (security, hierarchy), but both also form part of a management regime that caps the human capital development of the workforce.

Believing that training and learning is simple does not reflect reality on the ground. Staff at Consultco, for example, work fast and hard. With few formal requirements to train or incentives to learn, not much of either takes place.

At Consultco, workers were expected to pursue the training course they required themselves: 'I've got a big presentation in October which I absolutely must have some sort of training for...' said Louise, while badgering a manager to help bump her up the queue for a PowerPoint presentation skills course. No consultants could remember having training on Lotus Notes, the de facto working space.

At the division we visited, the informal, implicit sharing of knowledge has been 'officialised' by the use of 'champions'; such as volunteers like Peter, who is one of five champions in a department of 45. Peter had recently been involved in training colleagues on a major new implementation, holding four half-day sessions and with the aid of an assistant, teaching between six and seven staff how to use an upgraded work process system.

This style of training reflects the recognition that the organisational environment, the socio-technical system in which ICTs operate, is vital. Successful companies were encouraging, by a range of means, a 'play ethic' with technologies. In Designco, this meant giving free reign to the culture of learning and experimentation already present. In Computerco, one of the UK's leading firms, management were careful to balance freedom with a 'base' of formal

ground rules, on top of which people can experiment.¹³⁸ Both Computerco and Teleco (a major UK telecommunications player) also provide a range of formal and informal learning and discussion groups, to feedback comments on new equipment and programmes, and learning tips and techniques.¹³⁹

Not all of this is suitable for translation outside the high-tech sector. These firms derive clear advantage from testing products on their own workforce. However, the general approach is invaluable. It allows employees alternative ways of relating to the technologies and tools they use everyday. For some employees this means getting close and under the bonnet, exploring. For others, this simply meant ceasing to be scared of the technology and feeling that mastery had been achieved.

For workers, this means working with technology is better and more fun. For employers, a more skilled, confident and engaged workforce is an important source of competitive advantage.

Implementing change

Training and learning form important components in larger programmes of evolution and change. The design, planning and implementation of new hardware, software, systems and infrastructures crystallises all of the issues discussed so far. ■

Successful companies were encouraging, by a range of means, a 'play ethic' with technologies.

With a little help from my colleagues: learning and change

Change is never easy, and usually takes time. Employees seem aware that technology implementations more often than not carry with them changes in working practice.

Staff at Designco, for example, had bitten the bullet of a time/resource management system despite reservations about its impact on their creativity. They knew that a technology would change the way they worked, potentially the culture of the business.

However, our research suggests that the way technology change is sometimes handled makes it particularly hard – and particularly unlikely to succeed. The irony, of course, is that good practices are already established and tested (see Chapter 3), but they are not that widely known.

Across the sample, we encountered a mix of bottom-up/top-down and even team-based implementation strategies. Sometimes these changes sought to change organisational culture or ways of working. At other times they simply went against the grain. We found a worrying tendency towards a kind of ‘technological

imperialism’, involving top-down change, little consultation or little apparent understanding of either the organisation or the detail of working practice.

Staff in Consultco worked in an environment of frequent change. New technology strategy tended to be formulated at the top of the organisation, and then rolled out and downwards to employees and local units. Implementations were standardised and global, although the structure of the business was largely specialised and local, in terms of knowledge and geography.

Change was not always communicated clearly. A new version of Lotus Notes was heralded as allowing more ‘efficient and productive working’ though it was not specified how this might come about – the only noticeable change for employees was a modified interface. Telling staff something is happening is not the same as explaining why and listing benefits or reasons. As a partner exclaimed, having been told by a member of his team that the change had been announced and then duly implemented: ‘Ah, the standard consultative approach!’

Managers at Logisticsco also devised universal packages of new technology, but implemented them the other way around, communicating the need for change and then installing the equipment. This was made easier by the state of some of the hardware, software and systems in the firm.

It is hard to completely eliminate aspects and perceptions of ‘doing change to people’ – particularly if that’s exactly what is taking place.

‘I do not know if there’s any way you can get over that. It’s in the nature of human beings. I do not think we should underplay the lack of willingness for people to jump lemming-like over the edge of the cliff so that their jobs and incomes disappear on the basis of automated computer systems. People are suspicious of this stuff ...’

IT Director, Councilco

Communication breakdown

Problems arose in all the study sites when change was not communicated well. People felt disconnected from what was happening, or both. ■

With a little help from my colleagues: learning and change

Sometimes change was simply resented; at other times it was actively resisted. In Councilco, some employees' resentment of change was part of a general feeling of being low down in the organisation hierarchy ('you should see what they've got!') but also reflected some genuine concerns about being on the periphery.

In Consultco, managers talked of change weariness and could knowledgeably reel off new systems being introduced into their businesses or business units. But more often than not, their employees were not aware of impending changes. More importantly, it was not always clear to staff why a particular system was being introduced.

'We have got 12 implementations hitting us this year'

Partner, Consultco

Those in charge of change were felt to lack a good understanding – or even any understanding – of the nature of the organisation. Technology strategy, among other things, can be seen as a means of changing culture.¹⁴⁰ It's one thing understanding that culture is important. It's another understanding

the culture of organisations and working practices, and this was what was lacking.

'It's hysterical, the lack of cultural awareness'

Consultant, Consultco

For Consultco staff, a new online knowledge management system – the Gateway – was the focus of much frustration. There was some active resistance to using the system, which was perceived as less useful than existing software available.

In organisations where security issues were paramount, individual freedom has to be constrained. Managers at Mandarinco were highly concerned with maintaining data security and keeping their (human and technological) systems going, no matter what the external events. Security might be too important to leave to people. It is also often too esoteric:

'The rules governing security are amazingly complicated and boring to most people, so need to be handled by people who find them complicated and interesting. These people tend to be straight down the line, pedantic people. One brush with a virus like Slammer

*makes you like these types of people, because they keep the organisation honest.'*¹⁴¹

At Financeco, security was wrapped into a more general concern for managerial control and tightness of process. Implementation of change was top-down and impersonal, but rollout, communication and training were all very thoroughly done. Once again, the key was clear thinking about what measures were needed, and clear communication of why they were necessary.

What's going wrong?

Part of these problems can be traced to truculent staff, and to some more basic factors. People generally do not like shifting from a familiar environment to an unfamiliar one, and will often resist change or attempt to recreate old habits in new contexts.¹⁴² That only underlines the importance that managers understand their organisation and implement change in a way appropriate to their organisation in all its complexity. As we have seen, that did not always happen. ▀

With a little help from my colleagues: learning and change

In organisations where security issues were paramount, individual freedom has to be constrained.

Problems were most extreme when change was driven by IT executives or implemented solely by IT staff. This has a lot to do with ICT's position in most organisations: culturally, spatially and structurally separated from the mainstream, as we shall see in Chapter 9. However, similar issues arose even when mainstream management had a hand in implementation. Sometimes managers undoubtedly made bad calls; at other times, they took the easy way out and left things up to the IT department; or techno-enthusiasts, alone or in small groups, infiltrated and took charge of the process.

'... a group of technologists got together...'

Partner, Consultco

Whichever occurs, the result was often a design and implementation strategy based on an idealised vision of what ICT might achieve. Where this mindset had not taken hold, organisations in the sample – and elsewhere – appeared markedly more successful in implementing change. In these cases, some key decisions about implementation had been devolved to the

appropriate divisions, or even to individuals. Lucy Suchman makes it clear that implementation is continuous, not a single black box solution.¹⁴³

Staff in the division of Mandarinco we visited, for example, had the final say over what equipment they worked on and what programmes they used. Managers respected their expertise and trusted them to make the right choices. But the direction was that the final choice should be common and limited, allowing manageability and standardisation. Managers in Logisticsco and Councilco also demonstrated a similar, sophisticated understanding of the change process. Time spent on attention to local working practices and worker preferences is repaid in the returns appropriate ICTs deliver.

Industry insiders supported this broad approach, citing a number of other examples. In one case, once the basic benefits of a new piece of hardware had been established, rollouts were devolved to individual business units, making managers, who were sensitive to local issues, accountable for getting the return

on investment if they opted for the technology. In another, the company took care to design a new CRM system with the full involvement of frontline staff, who would have to use the system on a day-to-day basis.¹⁴⁴

Summary

Once more, common myths about what ICT is and what it can do come up against a much messier reality. Managers can take these claims seriously, even literally, and this makes a difficult situation worse. Having to rely on formal training systems that don't always deliver means people are often left without the skills and knowledge they need to use technology effectively. Top-down change processes can discourage feedback and two-way communication, cutting out the crucial feedback loops managers require to keep them in touch with ground level, and to quickly learn and improve from errors. At a higher level, an organisation's capacity to learn over time is compromised.¹⁴⁵ ■

With a little help from my colleagues: learning and change

The consequences of all of this aren't just measured in frustration. One survey estimates around £17bn of inefficiencies a year are caused by lack of knowledge about information systems at senior level.¹⁴⁶ Recognising and taking on the true costs of change more than pays for itself over the longer term. As we saw in Chapter 3, making complementary investments in people, processes, structures and management practice is essential.

However, even when bosses know what they want and how to do it, the rest of the organisation doesn't always play ball. And there is one piece of the equation still to be examined. One CEO suggests that: 'because the business people are uninterested in information systems, the information systems people have the power'¹⁴⁷ So far the IT team has remained on the margins of the discussion. Now it's time to bring it to the centre. ■

Chapter 9

'The people downstairs': IT staff and ICT industry

This chapter looks at the way IT staff, and the ICT industry more widely, talk about and construct technology at work. The people who supply, manage, maintain, improve and support ICT are a key interface between people and technology, inside organisations and outside them.

This chapter naturally focuses on problems because infrastructure remains invisible or is assumed until it falters or fails; research is, therefore, more likely to observe failure rather than success. We found excellent IT support and mature, adult-to-adult relationships about technology. We also found more simplistic thinking and practice and asymmetric relationships between users and 'providers'.

Technology and us

'IT people live in their own kingdom...there are so many layers of padding around the IT department it is difficult to know how decisions get made.'

Vicky, Consultco

If during the 1990s ICT became deified, then IT support staff have become the priests that intercede between the exalted technology and its users, the often mystified laity. They are accused by many users of living, almost literally, on another planet and at times finding it more difficult to talk to humans than interface with machines.

We encountered success stories in

organisations where IT support staff were regarded as useful resources to draw on. We also found instances where support was inadequate. A lack of support compounded problems arising from lack of training or confidence with ICT. Where support was failing a distance between the workers on the front line and the IT support staff was usually responsible. This distance was of three principal kinds: spatial, cultural and structural.

Spatial separation

IT staff are often quite literally out of sight and out of mind. This can be a good thing. ■

'The people downstairs': IT staff and ICT industry

If things are running smoothly for users and there are no critical system faults, invisibility can be a measure of success. However, more often we found that the IT team was spatially segregated from the main body of users – their clients. This might be in the bowels of a building (eg, Designco) or outsourced to a third party (Logisticsco) and managed offsite (Consultco). In these cases, a small staff was retained for problems that need to be rectified on the spot. This segregation tended to mean that the working practices of individuals and teams were invisible. The tendency is for such segregation to breed ignorance and at worst, contempt.

Cultural separation

However, physical segregation is not required for a feeling of 'them and us' to emerge. The terminology of ICT plays its part: a recent survey of UK office staff found that half felt IT staff 'spoke another language', with 40% believing IT people had no idea of the confusion they caused.¹⁴⁸ The story so far has contained a series of problems and failures in our use of technology at work, and in the way ICT is designed, introduced and managed in UK workplaces. That evidence suggests that views about technology can be too simplistic. Too much is expected of ICT, or workers' knowledge of the systems they use is simply assumed. The conversation

about technology at work needs to address these myths, and acknowledge that idle claims for technology will meet a more complex reality on the ground. We found some evidence of this cultural separation. At Researchco, the IT manager worked closely with the frontline staff, and despite his friendly, patient and helpful desk-side manner the feeling that some staff were either jinxed or simply grossly incompetent (and in need of better training) persisted. We found some similar attitudes at Designco.

'Her name is a byword for computer failure...some talk of her emitting a force field that destroys machines' Tech support, Designco ■

A recent survey of UK office staff found that half felt IT staff 'spoke another language', with 40% believing IT people had no idea of the confusion they caused.

'The people downstairs': IT staff and ICT industry

Box 2. Help is round the corner

The People Nearby – provide rich and highly contextual 'how to' information, insight and advice from their desk. For example, allow workers to identify if the network is down, or it is simply their email that has stopped working.

The Office Manager – provides 'how to' information to staff on Office components, particularly Word, on an ad hoc informal basis – says she 'knows all the short cuts', everything about templates etc. Other staff can also help on some of these functions.

The Finance/IT Director has wide-ranging knowledge about Access applications, the phone system, Office suite functionality, and will often get involved in sorting out phones etc.

The Full-Time IT Specialist provides systems support, responsible for the server room, sorting out malfunctioning or misbehaving equipment or network problems – in other words, deals with failures of the system rather than situations of lack of knowledge.



IT staff suggested that users become reliant on them, unthinkingly picking up the phone for help without troubleshooting the problem themselves. Evidence sometimes supports this claim. This complaint is perhaps unjustified, since in many cases frontline support was being provided by fellow workers and non-specialised staff, not the IT experts. Organisations contain rich sources of very practical and robust information in the form of people. This could be for assistance in simple matters such as how to send an attachment, or how to preview an Excel file, to more infrequent or unusual actions such as

merging data. At most organisations, people invariably know who the expert on this or that application or technology happens to be and ask them first. Communities of support and expertise exist among staff, just as they do among IT staff. The hierarchy of support we found at Researchco – one that worked reasonably well – is one we suspect is similar to that which exists in many SMEs in the UK (see Box 2).

Since it is dealing with issues that users cannot resolve themselves, the IT department becomes the focus of a good deal of workplace frustration. In larger firms, where a whole team of people can

shoulder the burden, that frustration can be dissipated. In smaller firms, or where outsourcing has taken place, one person may be the on-site department and bear the brunt of sub-optimal 'solutions'. We were told of one organisation where staff were ordered to direct all complaints through an offsite helpdesk rather than to the on-site expert – even if he was in the same room at the time.¹⁴⁹ We found a notice pinned to the shelving area of one 'client IT officer':

'I have a right to a private life. I am not responsible for the cock-ups of others...'
Structural separation ■

'The people downstairs': IT staff and ICT industry

Spatial and cultural disconnection mirrors and magnifies the structural disconnection that often exists upstream in the organisation, at management level. There are two sides to this divide, and both bosses and IT people play their part. As McKinsey research suggests, 'most companies now manage IT as a function separate and distinct from the business', which means that 'business leaders have no incentive to run IT with the same rigour they bring to running the business'¹⁵⁰ We explored the laissez faire approach of many managers towards ICT in Chapters 6 and 7. Some of the same attitudes can be found in many

IT staff. In both cases, what we observe is both outcome and cause.

Academic Michael Rose has compared IT professionals' perceptions of what was required to do their jobs properly, looking at core tasks and activities IT staff consider less important. These were then compared with data from other managers and professionals. The results suggest that IT staff see themselves as less concerned with maintaining quality of contact with others; less often needing to understand how their organisation works; and spending less time advising, persuading or counselling others. As Rose notes:

'In particular, [IT professionals] have far less contact with clients, spend less time in persuading others of a course of action, and above all suffer from a serious experience deficit in advising other people or showing them personal attention... "At the same time, they spend more time analysing and dealing with problems which are likely to be exclusively technical or system-related, while being very likely to know, and needing to know, less about the ins and outs of the organisation's operations than other groups. In sum, the work of [IT professionals] as a whole is systems orientated not people orientated."¹⁵¹

'The people downstairs': IT staff and ICT industry



There is now evidence that perceptions of what's required from IT people, at least, are starting to change. A survey by vocational training body City & Guilds found three-quarters of IT recruitment consultants stressed the importance of IT staff being good communicators. Seventy per cent felt customer relations experience was also key, and 60% thought business knowledge was also useful.¹⁵² Our research suggests these changes have yet to filter through to many shop floors.

Making these connections is even harder to do when the IT function is moved outside the organisation. Outsourcing IT removes an important 'feedback loop' between staff and management, through which information about the performance of hardware, software and systems is channelled. Informal learning and help will still be going on, but much of the core competence will have been removed. Over time these difficulties may be compounded, as staff increasingly avoid using external IT services and concentrate on internally generated, informal

solutions. Even less information flows to where it is needed. As the organisation's management has an increasingly imperfect picture of what's happening, organisational learning and innovation become harder to do. Attempts to run ICT as an 'outboard brain' run the danger of lobotomising the patient.

With friends like these...

So are IT staff there to support staff and allow them to be more productive? Again, it depends on the size and sector of the organisation, and as such, the level of competence that is on the shop floor. In smaller firms staff may quickly become overburdened, particularly if the technology itself is not performing as it should. In larger organisations where IT has been outsourced, we may find similar problems on the ground, made worse by ICT's separation from the organisational heart.

At Designco, where the staff are generally competent, and some employees inquisitive enough to find solutions when things go wrong, the three men in tech support (serving 100 people) see their roles as 'to improve the

productivity of the staff' through the provision of infrastructure (virtual private networks, for mobile access; wifi or 802.11b; standby computers for staff and 'reserved' computers for regular contractors) and a high quality of friendly 'human' service. They are hands-on, polite and respond quickly to calls for assistance. They keep the business moving.

At Councilco, IT staff deal primarily with system failures: network problems, cabling errors (in the past these had been running at 40 a day). However, this did not preclude an occasion when during our research, librarians would have to try to fix a network themselves: 'Is anyone here a network specialist?' a librarian asks, sarcastically, as they wait for the network manager, and prod around inside a case containing a multitude of cables, hubs and switches.

Resources are obviously a major issue. For smaller firms the burning question is: 'How big do we have to get before we employ someone to look after our ICT and users full time?' Our research suggests that the answer is 'sooner than you think! ■

'The people downstairs': IT staff and ICT industry

Selling

Leaf through any business or technology magazine and cast your eye over the copy. Advertisements stress 'having it all', 'getting things done instantly', 'no strings attached'. Of course, this is what promotion is supposed to do. But outside the domain of straightforward advertising, the marketing, promotion and language of many technology sellers is not markedly different. The implication is that making the purchase is all that's required. After-sales support will be on hand to sort out any teething problems: after that, managers can sit back and watch things get better. If managers and employees aren't thinking about ICT, it's partly because they are told not to:

'Rather than help companies understand that IT is only a tool, technology vendors have tended to present it as a panacea.

*'Buy this technology and all your problems will be solved.'*¹⁵³

As well as promising apparently endless success if you buy the product or service, many sellers make the converse claim; not buying will bring endless misery. The widespread scepticism of

many organisations – and some in the technology industry – about the real threat from the Y2K bug is one example of where fear may have been stronger than fact.

Security is important, and for some companies, critical. However, what is presented as a security risk demanding a technological 'solution' is not always as it appears. We found one company presenting IM and peer-to-peer technologies as grave dangers to productivity and security inside firms (a belief apparently shared by 89% of the IT managers questioned in a survey run by the company).¹⁵⁴ Using peer-to-peer systems may well, of course, involve illegal activity, but using IM does not. And while the company concedes that *'in time IM applications could be used as legitimate business tools'*, it ignores both anecdotal evidence and research demonstrating IM in its current form can and is used as a valuable workplace communication tool.¹⁵⁵

Hubris contains the seeds of nemesis. Over-selling in this way creates the conditions for under-performance: 'the

tendency to view technology, first, as a panacea and, then, after the hype proves unrealistic, as anathema.'¹⁵⁶ There is a danger that clients could move from having excessive expectations to having very few expectations.

We found this 'all or nothing' attitude in some of our case studies. In Consultco, an informant told us that she didn't see the point of IM *'since you might as well send an email or pick up the phone'* – expecting total transformation, she moved to assuming no change. This is an extreme example, but it is easy to see this in the increasing scepticism, cynicism and apathy that have taken root in boardrooms across the UK about the benefits of ICT.

The very public rise and fall of dotcoms has, of course, contributed to the hardening of mood. And we cannot lay all the blame at the vendors' door. Management also has a responsibility to educate itself, find out the facts and filter out the hype – something bosses and middle managers alike haven't always shown commitment to doing. ■

If managers and employees aren't thinking about ICT, it's partly because they are told not to.

'The people downstairs': IT staff and ICT industry

Management attitudes have contributed to the structural separation of ICT from the mainstream of many firms.

Summary

How well do IT staff and the ICT industry support UK organisations? This chapter has shown some successes, but more failures. The potential of IT support staff is often hampered by their social, spatial and structural distance from their end users. Out of sight or off-site IT support teams can become divorced from the needs of workers. These disconnections further hinder IT staff's understanding of what people do, and what they need. The use of jargon often further

complicates the support process and relationships between support staff and workers.

That said, the job of IT staff is made harder by the high expectations and low skills that many workers (and managers) display. The lavish promises and claims made for much new technology contributes to this. The ICT industry's selling techniques create expectations that often can't be fulfilled. In many cases, IT staff bear the brunt of the frustration this creates. ■

Chapter 10

Summing up: low tech equilibrium

What have we learnt from all of this? First, ICT is now pervasive in most UK workplaces. It has entered working life, and most people can no longer do without it.

But technology is not always as useful as it is claimed to be. Technological ‘solutions’ are often partial and fragile, held together by human glue. Extensive cultural and organisational change is often required to get the most from ICT.

Second, organisations are complex, and there is no simple link between deploying a technology and seeing the results. External relationships, internal power struggles, politics, organisational culture and bad decision-making all complicate the process on the ground. What’s more, people enjoy finding their own uses for things. In the workplace, just as outside it, we try to use technology to suit ourselves.

Third, much of the discussion of and beliefs about new technology is misleading and unhelpful. This greatly compounds the problems we’ve seen. ICT tends to be presented to bosses and managers as a total solution, something that can integrate different parts of the organisation and give easy control over processes and people. And technology is often presented to all of us, inside work or outside it, as something that can simplify and give us control over our lives.

In many cases, the result is low tech equilibrium. Organisations slip into a second-best use of ICT. They are not

getting on, but getting by – often in spite of ICT, not because of it.

The untidy truth

Popular and commercial discussion about technology, consumer and business, constructs it as saviour at various levels. We found three common claims made for technology – claims embedded in the attitudes and beliefs of many of the managers and employees we spoke to, and persisting in much of the language and behaviour of IT staff and the ICT industry. These myths are surprisingly persistent. They are also damaging. They act to obscure the untidy, messy realities set out in previous chapters. ■

Summing up: low tech equilibrium



They preserve unrealistic views about what technology is and what it can do. And when acted on, as they often are, they directly contribute to poor application of ICT at work.

The myth of integration

ICT is supposed to allow the integration of a vast range of organisational, cultural, economic and technical resources. Various drivers exist to make this an imperative. Profit, effectiveness, market opportunities and competitive pressures. There are three key aspects of this process of integration that we can identify: that of organisations, systems and tasks and process. Technology is most often seen as the enabler, particularly as convergence becomes the key buzzword.

As we have seen, it is clear that people (and paper) are central to these processes of integration. At all levels, human interaction is required to make integration as success. For organisations and individuals, ICT can create as much work as it saves – particularly if poorly applied. In all but the most technologically able companies in our

sample, notably Designco, integration was still a dream, not the problematic reality most workers experienced. By the same token, it was unclear that employees always felt as integrated as they felt they should be. Feelings of disintegration arose.

Of course, even optimistic accounts reflect some role of social and human factors. As Leadbeater makes clear:

*'Networks can be enabled by technology, but they are held together by social ties... So, as networks become increasingly important to competitiveness in the modern economy, so will social capital.'*⁴⁵⁷

But this is not the whole truth: what's left out is the extent of human activity required to set up and keep processes of integration going at ground level.

The myth of control

ICT is also supposed to allow managers easy control over processes and people, or allow individual workers to get a better grip of tasks and work activity (and sometimes both). From one management perspective, ICT seems to furnish a new set of tools for managers to set up a

rational, perfectly balanced workplace – the Taylorian vision. From the individual perspective, ICT offers a way out of piling hell, a simple way to get control of one's stuff.

Much of what we've encountered suggests that for many this is still some way off. Technology does not hand over control to either group. For managers, it can produce reams of data that can be used, after the event, to reconstruct accounts and occurrences, but it can rarely be marshalled on the fly to produce the sort of control typically promised. For individuals, software and systems are just of the tools typically required to manage one's information and to communicate effectively. Either way, control is never complete unless a lot more is done.

The myth of solutions

Both of these notions are component parts of a third claim: that ICT can provide a complete, unifying 'solution' to a range of managerial and individual problems and dilemmas. The word 'solution' is commonly used by sales people and consultants. ■

Summing up: low tech equilibrium

It implies a belief that technology alone can solve some of the problems we've encountered so far. It also implies that problems can be solved in one sweep; once the 'solution' is installed, your troubles are over.

As we have seen, things don't usually work out like that. Any technology-based 'solution' typically involves a series of connected activities, not simply installing a product or buying in a service. The reality of computerisation is that extensive cultural and organisational change is often required to get the most from 'solutions'.

'Solutions' themselves tend to be off-the-shelf packages for highly individual problems. They cannot be expected to solve all the equations that exist for any one organisation, or even individual. What's more, packages are usually purchased from suppliers with little detailed knowledge of purchasers circumstances, and are also likely to be maintained by people without detailed knowledge of the organisation. ICT is rarely a total solution, and the discourse that constructs it as such encourages simplistic 'ICT systems thinking'

that ignores the richness (and resources) of actual activity.

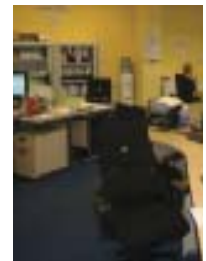
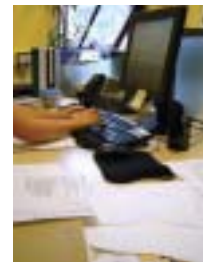
These myths don't stand up well in the light of day. But the rhetoric of solutions, integration and control is attractive: this kind of technological systems thinking offers a way of simplifying the world, reducing it to basic relationships that seem easy to manipulate. This kind of thinking dominates much of the imagery and popular discussion we encounter day to-day. As Schwarz et al point out, a great deal of advertising, popular media, consultancy and business literature gives the impression that technology will make life ever easier and simpler, ever more flexible, mobile and virtual.¹⁵⁸

These myths of technology compound the lack of understanding many managers already have about what ICT can do. They help maintain beliefs about technology, leave out many of the costs and changes actually required to make technology work, and ignore the complicated realities of working life. To put it another way, we have a discourse that 'deletes' the uncomfortable parts of the story, leaving only the happy ending.¹⁵⁹

Low tech equilibrium

All of this leaves many British workplaces in what we describe as 'low tech equilibrium'.¹⁶⁰ New technologies are often poorly designed, delivered, managed and maintained on the ground. Managers lack the interest, staff often lack the skill to do it any better. Persistent myths about ICT and what it can do compound the problem. They obscure complex, untidy workplace realities, and make it harder for managers and employees to understand and use ICT appropriately. Technological systems thinking of this kind is inadequate at portraying how technology actually works to real life organisations. But when key decisions were handed over to technologists, as they usually were, it is this perspective that often decided what is done.

Low tech equilibrium arises from the messy realities of organisational life. It is reinforced by bad decisions and poor application of ICT, and compounded by fuzzy thinking about technology. ▀



Summing up: low tech equilibrium



It is anchored by lack of interest by management, disconnected IT people and low skills on the ground. To return on the key concepts of Chapter 3, it is a particular configuration of the organisational ecology, a particular iteration of the socio-technical system.

It is a second best outcome. People and firms are getting by, not getting on. Having, in many cases, invested a good deal of money in ICT, organisations are getting very little from their new assets. On the ground, technology is not helping people do their jobs nearly as much as it could. In some cases, it is actively contributing to unhappiness and frustration: people are working in spite of technology, not because of it.

Another way to look at this is to use the notion of 'local maxima':¹⁶¹ Organisations reach a point where there are some perceived benefits from ICT, but for the reasons outlined above, further change is difficult, undesirable or both. A semi-stable situation results. Either way, the outcome is the same: a systemic problem, the outcome of multiple processes and actions. No one group is to blame;

everyone is. The attitudes and behaviour of managers, employees, IT staff and outside players combine to create sub-optimal outcomes.

Some of our general frustration at how ICT operates in the workplace reflects our unrealistic expectations about what it can do. Managers thinking this way are likely to make bad decisions in the design, implementation and management of technology in the workplace. Again, there's a personal aspect to this: a number of managers we talked to had also bought the 'solutions' line and become deeply frustrated with it. But poor decisions made at the top have ramifications for everyone in the organisation.

Technological systems thinking attempts to apply totalising, functional logic. IT staff often expect people to reformat their goals so that they can be fitted into the often-flattening logic of systems thinking. Both inside and outside organisations, this thinking and this approach lies behind many of the problems we found. Advertisers, management gurus, consultants and

media all play their parts in sustaining technological systems discourse – as do uninformed managers and decision-makers inside firms.

The limits of strategy

Of course, we found many isolated examples in these organisations where technology was working as intended. We also found some cases where technology was working very well, and where individuals, teams, groups and organisations were performing better as a result. There will be many other organisations like this across the UK. But they are likely to be in the minority.

There is a powerful reason for this. In an organisation, the forces of low tech equilibrium operate to slow firms' deployment of technology when appropriate. Across organisations, however, the effect can be magnified and the problem becomes worse.

Technologists often point to 'network effects' to explain the benefits of ICT. For example, if someone has a mobile phone, they can make calls on the move. ■

Summing up: low tech equilibrium

But if 10 other people also get picture phones, then they can begin to co-ordinate arrangements while on the move, send text messages and so on. Scaling up the number of phones creates all kinds of positive benefits that arise simply from the amount of technology in circulation.

For the smaller firms in the sample, in particular Lawco, Designco and Researchco, network effects also magnify the power of low tech equilibrium. These organisations were very conscious that they operated in a web of relationships. These relationships significantly affected the way they behaved, and the way relationships were conducted.

Lawco, for example, operated in a sector where use of technology was limited. Even if Lawco had decided to computerise all systems, it would have to revert to paper, voice and face to face to deal with clients, customers and competitors. A form of low tech equilibrium was pervasive across the sector, not just in the firm. Network effects meant there was little point in Lawco – or any other small firm in the

sector – deploying more technology. Similarly, use of ICT in Researchco was limited because clients and customers often did not use it.

A company with market power could have changed this dynamic; their decision to computerise is likely to force others to follow suit. But monopoly buyers or suppliers are relatively rare. And where an organisation is competing for business, they will have to adapt their use of technology to suit clients with the power to switch.

Studying ICT and productivity in the UK, government economist Nick Oulton argues that network effects are one explanation why investment in technology has not yet paid off.¹⁶² Our findings suggest he is right. In many cases, there are simply not enough uses of ICT for organisations to benefit, and this situation can become self-reinforcing.

Do you really want to delete?

In a word, no. But it is too late for that. It is important to restore what's been deleted. At one level, workers and managers need to recognise that

'technology work' is a real part of the job; spending time to make ICT work as wished is a reality of modern working life. But decision-makers in organisations also need a better understanding of what technology is, and what it can do. Taking the ecological perspective is crucial. Managers need to treat their organisations as complex entities, not as production functions to be tweaked at will. Technology is part of a larger system, not a thing in itself.

Low tech equilibrium is likely to affect the majority of UK workplaces. Poor understanding, application and use of technology appear common. But even where managers are willing and able to deploy ICT appropriately, decisions may be compromised by environmental conditions.

So where do we go from here? To move out of low tech equilibrium, action will be required at many levels: individual, organisation, sector and economy. The final two chapters explore the broader implications of the scenario, and sketch out an outline response. ■

CONCLUSION

Conclusion

This research began with four questions.

- How are individuals using ICT in their work?
- How are UK organisations planning, diffusing and managing ICT?
- How does the experience of ICT differ across sectors, occupations and positions?
- Are the supposed benefits of ICTs being realised in UK organisations? How much does ICT matter?

What have we found? It's clear that of the various seismic changes predicted for the world of work over the past two decades, only the technology story has begun to live up to the hype. Computer use has vastly increased, and has helped bring about changes in working life. ICT is becoming part of the furniture in many workplaces, something we barely register until it goes wrong. For many people, technology is becoming invisible. Only desks without computers look peculiar.

The macro view shows that technology has penetrated most sectors, many processes and many tasks. On average, ICT is associated with new management techniques, higher skills and increasing

work intensity. And technology appears to have made some contribution to productivity growth in the UK. It is hard to say more than this – complexity and contradictions take over. This is where the macro view gives out, and new perspectives are required. This research has used the notion of the organisation as ecology to explore, in detail, managers and workers' attitudes to and use of ICT. On this view, technology is part of a complex socio-technical system, one that requires careful unpicking.

The results are revealing. It is clear that different organisations and people use new technology in very different ways. For some, ICT has meant new freedoms, new choices and new skills; for others, new constraints and complications. Even in a limited sample such as this, clear differences have emerged. But at the same time, we have been surprised by how much our case studies have in common.

Simply dropping in a new technology doesn't always lead to predictable outcomes. Politics and structure colour strategy: competing agendas, the

dynamics of power relationships and the distance between decision-makers and the ground can all distort what happens and who gets what.

New technology has given some people more choice and flexibility. But in other ways, ICT helps create as much work as it saves. Setting up and maintaining new hardware, software, systems and infrastructure can be a job in itself. The virtues of email, in particular, can quickly become vices.

And many 'solutions' are anything but. Time and time again, it is people who plug the holes in technology. Where official systems fail, people default to personal solutions: overflowing inboxes, bulging hard drives and piles of paper on desks and in corners. Information management, control and surveillance, networks and integration are all areas where new technology is less useful than it could be.

But none of this quite answers the most important question of all. Does ICT matter? Is the widespread business scepticism about technology justified? ■

Conclusion

As Carr suggests in 'IT Doesn't Matter', has computerisation remade technology as a commodity, with no more transformative power than a table or chair?

In some ways, Carr is right. If organisations and their managers do not get the technology basics right, they will not succeed. Unreliable internet connections, non-functioning CRM systems, computers that crash and unhelpful IT support can make it very difficult to get through the working day.

Equally, new technology inappropriately applied or poorly implemented is unlikely to create advantage. As we have seen, many 'solutions' turn out to deliver rather less than they promise, for these reasons, or because the technology itself is not up to the task.

To use a piece of management jargon, in these cases ICT is a hygiene factor, not a motivator – something without which things go wrong, but which does not lead to increased performance. However, it is clear from our research, and from other work that ICT can be much more than this. In many cases, though not all, ICT

can and does contribute to faster, easier working and to improved organisational performance. This is where ICT does matter. The key lesson is that new technology is not transformational on its own. It is one of many levers that can be pulled. Appropriate use of ICT requires considerable complementary investment in people, processes, culture and support. From what we have seen, some or all of this is usually missed out. There is a big gap between best practices and practical reality.

The outcome can be characterised as low tech equilibrium. Organisations settle into below-par performance and stay there. People get by, but are often frustrated by technology and in some cases, prevented from making more of it by the structural and cultural obstacles they come up against. Pervasive myths and misunderstandings about technology compound problems and make it harder to see ways round them. At the same time, network effects can make it rational for individual firms not to change their ways.

The macro implications are disturbing

both for the UK's overall economic performance and the quality of working life. Over the past few decades, productivity gains through ICT have been identified, but remain arguably less than they could be. And as computer use has spread, job satisfaction and organisational commitment has plummeted. No one would want to argue a direct link between the two. But given the evidence of this research, it is plausible that the way ICT has been introduced and managed has contributed to unhappiness and stress at work. Either way, technology is not delivering. The progressive possibilities of technology have been blunted by the realities of organisational life.

How to move from low road to high road? Breaking organisations out of low tech equilibrium is not straightforward. Vendors must make more usable gear; companies must buy and implement better; employees must find out how to make best use of it all. This requires smarter strategies and practices, of course. ▀

CONCLUSION

Conclusion

Box 4. Why ICT can matter

- 1. Ubiquitous ICT:** There has been a vast increase in the amount of new technology in British workplaces during the last decade. It is becoming pervasive.
- 2. Essential ICT:** Many British companies, and their employees, have quickly evolved to a lever where ICT is a precondition for existence. Without it – from servers and databases to email and the Internet – most British firms would now find it impossible to do business.
- 3. Excellent ICT:** Throughout this report we highlight examples of good practice, in which ICT is working well either by improving (a) productivity or (b) working life. Because it works well sometimes, we suggest, we can work to make it work better more often.
- 4. Productive ICT:** The evidence is now clear that investment in technology, done in certain ways, does help improve organisational performance.

But it also requires some sharper thinking and a clearer conversation about what technology is and what it can do. Taking the ecological view of an organisation is crucial in understanding how technology is used, where it adds value, and where it does not. ICT must be understood as part of a complex system, a system that must be mapped out if benefits are to stand a chance of being achieved. The next section draws on these insights to set out some general principles and outline ideas for change.

Investment in ICT is very rarely an outright failure. Generally, it can help make things a little better in some areas, and sometimes a little worse in some others. Sometimes it even helps make

a really big difference. But – and this is the crucial point – only rarely does it deliver (or exceed) what it promised. And the leaders and employees of Britain's companies are beginning to twig.

This report, therefore, is both a reminder and wake-up call. ICT remains a power of enormous potential to make all our working lives better. But we have proven the gut feeling of most people who use it. ICT is, in effect, frequently under-performing and under-delivering.

Overall, we believe that millions of British workers, and the organisations in which they work, deserve a better deal from their technology. We also believe that the ICT industry is capable of

providing that deal. It is critical to understand where technology can help, to learn from the good examples shown in this report.

We believe that people, using ICT at its best, can make Britain work better. ICT does matter. The challenge is to make it matter more. ■

Recommendations

This section draws out the practical implications of the research, and sets out some of the ways in which organisations, government and the technology industry can improve use of ICT in UK workplaces.

Two caveats. First, in large part our research confirms findings that are quite well known. What is worrying is how few organisations are paying attention; how few are acting on key lessons, and applying good practices. In repeating and sharpening these lessons, we hope to inspire more organisations to follow them and to build on bodies of good practice for government and industry.

Second, an overwhelming theme of the research is complexity. There is no single technology story, and no one best way for organisations to use ICT. So what follows are mainly general principles, not specific actions.

Organisations

Alone, technology is not transformational. Technology is one lever that management can pull to try and increase performance. Simply pulling that lever will achieve little unless organisations invest in people and processes at the same time. Firms are complex entities, and there is no simple route from installing the technology to seeing the benefits. Investment in ICT needs organisational underwriting; building management capability; aligning people, processes and systems; and ensuring all stakeholders are consulted on strategy and change.

Thinking about technology

Technology is a tool. Managers should think about what the organisation is trying to achieve, then consider whether and how ICT can help. The key is appropriate use of technology. Sometimes less is more: Mandarinco's knowledge management system achieved its ends by limited use of ICT. Sometimes more is more: Financeco's knowledge management system achieved its ends by computerisation, large-scale investment, serious staff training.

Organisations should:

- Understand what technology can and can't do. Alone, it transforms little. ■

RECOMMENDATIONS

Recommendations

- To take effect, investment in ICT needs organisational underwriting: parallel changes in people and processes.
- Focus on organisational aims and then consider appropriate use of ICT. Sometimes less is more, sometimes more is more.

Taking technology mainstream

A key problem we encountered was the structural separation of ICT management from the management mainstream. The latter often showed little interest in or knowledge of ICT; the former took decisions without proper awareness of how it would help the firm. Management as a whole needs to become accountable for decisions about technology and its implementation.

This is a challenge for both groups. To achieve it means tying personal performance to technology diffusion and maintenance. It also means leadership from the top: CEOs and directors showing an active and consistent interest in technology. **Organisations should:**

- End the separation between technologists and mainstream management. Make mainstream managers jointly accountable for design, diffusion and performance of ICT. Consider tying reward to involvement in ICT strategy.
- Ensure all stakeholders of the firm are consulted and involved in decision making and ongoing technology management.

Better geeks

An important part of this joining up process will be overcoming the cultural barriers between technologists and everyone else. Changing the way CIOs and IT staff speak about technology should help: getting rid of jargon, clearer examples and analogies are all helpful ways to do this. At the same time, IT staff should take on a more active role, becoming less like passive support staff and more like 'IT mentors'. Organisations should think carefully before outsourcing IT services. There can be clear benefits from concentrating on core competencies in this way. However, organisations need to retain the ability to assess suppliers and what they can offer; and staff need experts to turn to quickly when things go wrong.

Organisations should:

- Take IT staff out of the server room, discourage jargon and focus on clearer language.
- Move IT staff from a passive 'support' role to an active 'mentoring' role.
- Think carefully before outsourcing. Maintain people on-site if at all possible, and ensure management receive regular feedback from the ground.

Skills and knowledge

None of these changes will embed without better ICT skills and knowledge. This is true across the organisation: managers appear as disconnected and disinterested as their staff. Tying

performance and reward to involvement in ICT should start to shift behaviour, but to ensure managers then take the right decisions, a mix of formal and informal skills measures is required.

Formally, firms should implement organisation-wide ICT skills audits, measuring a mix of basic skills and department/team-specific skills. These could be 'technology MOTs', done annually to ensure the firm is in good shape. Organisations need to deal with the lost generations of senior decision-makers without skills or knowledge of technology. They should prioritise ICT training for managers and senior staff, ending the dependence on PAs and the spectacle of 'chauffer-driven PCs'. Informally, firms need to recognise the limitations of formal training and the strengths of informal, peer-based learning. They should take steps to support and bolster this. Tech-savvy staff should give informal advice to managers on decisions about technology, acting as a sounding board for management strategy. Providing informal advice and expertise to peers should be recognised as work, factored into job descriptions and rewarded by bonuses if appropriate. ■

Recommendations

Organisations should:

- Develop 'Technology MOTs' for firms, running an annual audit of the organisation's basic and specific ICT skills.
- Teach CEOs to type: recover the lost generation of managers and executives without ICT skills by giving priority training for senior staff.
- Recognise, support and reward informal learning systems inside firms. Use tech-savvy staff as informalsounding boards for decisions.

Technology industry

The technology industry has often been its own worst enemy, leading to perceptions of over-hyped products, scares and under-performing services. What is clear is that the industry's clients do not always take the necessary steps to ensure technology investment pays off. The industry can and should focus more on implementation, not simply installation. Technology firms should spend more time with clients, helping them plan investment but also helping organisations adapt and absorb ICT into workflows and work practices.

Equally, the industry needs to develop and improve reactive support services. The helplines and outside consulting already in place can mop up some problems, but there is not yet an established firm with national presence,

easy to understand services and proven track record. This requires a different marketing proposition and services from most technical support players. SMEs, in particular, would benefit from a 'digital AA' of this kind.

There is clear frustration in parts of the industry at firms' unwillingness to embrace new technology. Our research indicates that lack of network effects is one reason for this: the speed at which many organisations can embrace technology is determined by what other organisations do, not just by management. The industry needs to take steps to eliminate low tech equilibrium between firms, not just in them. This means making the right strategic decisions about where to concentrate offers. On the one hand, the industry should work with large clients with the power to shape supply chain dynamics, and spend more time targeting the technologies that link organisations to each other; on the other, it should (in partnership with Government) work across networks of SMEs, helping to lift all boats (see below).

The industry should:

- Develop 'digital mentoring' of clients, concentrating on successful implementation and absorption of technology into the business. Installation is not enough.

- Develop a 'digital AA' or 'eRAC' business high: profile, user-friendly technology emergency services.
- Develop strategies to allow firms to network more effectively with each other, leveraging the network benefits of ICT.

Government

These findings should be of concern to government: low tech equilibrium affects both quality of working life and UK productivity. Skills and workforce development is one key area for intervention: the supply of technology skills should be ramped up. We should be worried by low ICT skills among the UK workforce, and many managers' laissez faire attitude to achieving them. ICT skills are now considered a basic skill by the government, which is already taking steps to improve workforce development systems. This encouraging start should be built on. Organisations taking part in employer learning pilots should receive additional encouragement, or funding to give staff ICT skills. The Investors in People programme could explicitly recognise investment in technology skills.

However, policy should go further. The government should consider introducing mandatory 'technology driving licenses' for all school leavers. ■

RECOMMENDATIONS

Recommendations

These would cover common processes, packages and equipment – rather as the driving licence now requires holders to know how cars work, as well as how to drive them. These licenses would act as minimum requirements for using technology at work, pulling together other programmes already in operation. The scheme should be progressively rolled out across the workforce, starting with disadvantaged and unskilled groups, through the New Deal programme and others. 'Computer driving licences' covering popular office software already exist, but are used by a tiny fraction of the workforce. Much more needs to be done here.

Government also needs to intervene on the demand side, to encourage smarter and more appropriate use of ICT among employers. This means taking steps to tackle systemic low tech equilibrium across firms and sectors. This means using existing business support systems to actively champion advantages of properly implemented ICT. Existing infrastructure – learning clubs, local champions and online resources – should be matched with more active outreach and support.

Again, the focus should be on successful adaptation and absorption of ICT, not simply adoption. Equally, particular points of focus, such as broadband, knowledge management and security, should help to keep organisational learning manageable.

Business Links and the office of the e-Envoy should all make this a strategic priority. The Small Business Service, in particular, needs to work across networks of SMEs to tackle sectoral inertia. Government may also want to consider working in partnership with the technology industry to champion good practices. And the public sector should be used as a lever of change and a public example of what can be achieved through intelligent, appropriate use of ICT. Where possible, improving working practices in the sector should be matched with a concern to change workflows in partners and suppliers of public sector organisations. The public sector needs to become less about eGov than smartGov.

Government should:

- Consider mandatory 'technology driving licenses' for all school leavers. Roll this out across the whole workforce, focusing on disadvantaged groups.
- Introduce explicit technology dimension to existing workforce development initiatives.
- Use business support systems to build ICT knowhow, and improve advice and support amongst employers, particularly SMEs, through more active outreach programmes.
- Use public sector as lever of change and public example of the benefits of appropriate technology use. ■

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