

# Business Process Management



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# Business Process Management

*Integration in a web-enabled  
environment*

**MARGARET MAY**

PEARSON EDUCATION LIMITED

Head Office:  
Edinburgh Gate  
Harlow CM20 2JE  
Tel: +44 (0)1279 623623 Fax:  
+44 (0)1279 431059

London Office:  
128 Long Acre  
London WC2E 9AN  
Tel: +44 (0)20 7447 2000  
Fax: +44 (0)20 7447 2170  
Website: [www.briefingzone.com](http://www.briefingzone.com)

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## About the author

Margaret May FCMA is a director of a firm of consulting CIMA members, MAP ([www.m-a-p.co.uk](http://www.m-a-p.co.uk)). MAP specializes in advanced management techniques designed to prepare organizations to change the present and manage the future.

Following a career in finance and administration in both the private and public sectors, working for, among others, British Steel, North West Securities (Bank of Scotland), Cheshire Police, Southern Electricity and Bowthorpe Holdings, she moved into general management, running the Thermoplastic Sheet Division of Doeflex plc. She entered consultancy, forming MAP with other CIMA practising members, in the early 1990s and has specialized in the development of process/activity-based techniques, performance management, performance improvement, information management and change management, concentrating particularly on the practical aspects of implementation.

In addition to her consultancy work, Margaret is a regular seminar and conference presenter, visiting university lecturer and a member of CIMA Council since 1994. She currently sits on the CIMA International and Technical Committees. Her recent publications include articles in *Management Accounting/Financial Management*, *Real Finance* and *Finance Today*; a chapter in the *Gee/CIMA Handbook of Management Accounting*; and IFAC-published research entitled *Preparing Organisations to Manage the Future*. This book is supplemented by a second book by the same author, entitled *Transforming the Finance Function: Adding company wide value in a technology-driven environment* (2002), also published by Pearson as part of their Financial Times Prentice Hall Executive Briefing series.

The author runs seminars through MAP – both public and tailored in-house – on the subject matter of these books and can be contacted directly at:

[mmay@m-a-p.co.uk](mailto:mmay@m-a-p.co.uk) Mobile




07973 500539 MAP office



01538 385364.



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# Abbreviations

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3G	third generation wireless technology
ABB	activity-based budgeting
ABC	activity-based costing
ABCM	activity-based cost management
API	application program interface
ASP	application service provider
ATM	asynchronous transfer mode
AVS	address verification service
B2B	business to business
B2C	business to customer
B2E	business to employee
B2M	business to mobile
BASDA	Business and Accounting Software Developers' Association
BCI	business community integration
BPM	business process management
BPMI	Business Process Management Initiative
BPR	business process re-engineering
BSC	balanced scorecard
BU	business unit
C2C	customer to customer
CBI	Confederation of British Industry
CEO	chief executive officer
CFO	chief finance officer
CIMA	Chartered Institute of Management Accountants
CIO	chief information officer
CNP	cardholder not present
COD	capacity on demand
COO	chief operations officer
CPFR	collaborative planning, forecasting and replenishment
CRM	customer relationship management
CTI	computer and telephone integration

CTX	consortium trading exchange
DAS	direct attached storage DCM
demand chain management	
DOS	denial of service
DSS	decision support system
DTI	Department of Trade and Industry
E2E	end-to-end [processes]
EAI	enterprise application integration
EBPP	electronic bill presentment and payment
ECCMA	Electronic Commerce Code Management Association
EDI	electronic data interchange
EFT	electronic funds transfer
EI	enterprise integration
EIAC	Electronic International Attribute Code
EIP	enterprise information portal
EIPP	electronic invoice presentment and payment
EIS	enterprise information system
EMS	enhanced messaging service
ERP	enterprise resource planning
ESA	enterprise service automation
FAQ	frequently asked questions
GPRS	general packet radio service
GPS	global positioning system
GSM	global system for mobile communications
HR	human resources
HSCSD	high speed circuit switched data
HTML	hypertext mark-up language HTTP
hypertext transfer protocol	
IHX	independent horizontal exchange
IM	instant messaging
IP	Internet protocol
IPR	intellectual property rights
IS	information system
iSCSI	small computer system interface (electronic)
ISDN	Integrated Services Digital Network

ISP	Internet service provider
IT	information technology
IVX	independent vertical exchange
KIS	keep it simple
KPI	key performance indicator
LAN	local area network
LCV	lifetime customer valuation
MD	managing director
MMS	multimedia messaging service
MRO	maintenance, repairs and operations
NAS	network attached storage
NPI	non-production item
NPV	net present value
OLAP	Online analytical processing
OPA	Online Privacy Alliance
OSI	open systems interconnection
OTD	order to delivery
P&G	Procter & Gamble
P/ABT	process/activity-based techniques
P2P	peer to peer
PBA	Process-based accounting
PBB	priority-based budgeting
PBM	process-based management
PBT	process-based techniques
PDA	personal digital assistant
PIN	personal identification number
PKI	public key infrastructure
PLM	product lifecycle management
POS	point of sale
PR	public relations
PSA	professional services automation
PSP	payment service provider
PTX	private trading exchange
RF	radio frequency
RIP Act	Regulation of Investigatory Powers Act 2000



ROI	return on investment
S/DCM	supply/demand chain management
SAN	storage area network
SBU	strategic business unit
SCM	supply chain management
SLA	service level agreement
SME	small or medium-sized enterprise
SMS	short message service
SOAP	simple object access protocol
SPO	service process optimization
SRM	services relationship management
SSC	shared service centre
SSL	Secure Socket Layer
STP	straight through processing
SWOT	strengths, weaknesses, opportunities, threats
TCO	total cost of ownership
TCP/IP	transmission control protocol/Internet protocol
UDDI	Universal Description Discovery and Integration project
UM	unified messaging
UMTS	Universal Mobile Telephone System
UNSPSC	Universal Standard Product and Services Classification
VAN	value added network
VBM	value-based management
VoIP	voice over Internet protocol
VPN	virtual private network
W3C	World Wide Web Consortium
WAN	wide area network
WAP	wireless application protocol
WLAN	wireless local area network
XBML	extensible business mark-up language
XBRL	extensible business reporting language
XML	extensible mark-up language
XMS	extended message service
Y2K	year 2000

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# Introduction

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With the current downturn, margins are being squeezed in most industries, resulting in an urgent need for higher efficiency and greater effectiveness, including the putting in place of better-value ways of working. A true e-business of the twenty-first century is one which thinks and acts in a way that allows it to collaborate, integrate and empower by:

- internal and external business processes working together seamlessly, enabling collaboration with suppliers, partners, employees and customers across traditional enterprise boundaries;
- ensuring that employees have at their fingertips the information, applications and services they need to do their jobs.

It is the Web and the applications, standards, tools and services that have been developed around it that have removed the traditional barriers to building collaborative relationships and now made it an economically attractive option. The benefits from the transformation of business processes are derived from eliminating intermediaries like wholesalers and retailers from the value chain, removing manual operations, improving productivity and speed of operation, increasing efficiency and enhancing customer and supplier relationships.

According to industry analysts IDC Research,<sup>1</sup> companies are on the brink of another growth cycle in IT spending, with application integration, mobile wireless and security the chief factors driving companies to invest in technology. A joint survey released in May 2002 by KPMG<sup>2</sup> and the CBI reveals that 90 per cent of companies believe e-business will reduce costs by at least 10 per cent but only 15 per cent are currently reaping the rewards. Improving business processes alongside new technology could boost the profits of UK companies by £4.3 billion a year according to the Gartner Group,<sup>3</sup> who quote Easyjet and Tesco as two examples of organizations that have maximized their agility. By re-engineering the distribution chain and pushing sales online Easyjet cut out the costs of sales intermediaries and then further reduced costs by issuing e-tickets. Improvements with customer information at Tesco has reduced lost sales on promotions by 33 per cent and reduced promotion overhead and waste by 30 per cent, while wireless technologies have also increased the productivity of warehouse staff and improved the accuracy of warehouse-to-store deliveries.

In this briefing we take a look at this subject with a non-technical and pragmatic approach by dividing it into four parts.

## THE STRATEGIC BENEFITS OF COLLABORATIVE WEB-ENABLED BUSINESS PROCESS MANAGEMENT

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Collaborative commerce had its beginnings in the 1980s with both electronic data interchange (EDI) and Procter & Gamble and Wal-Mart's 'collaborative replenishment' project. Today, with the move towards greater collaboration and increased outsourcing of both core and non-core activities, companies are becoming virtual organizations – a combination of organizations working together in close partnership, with shared risk and reward, to deliver end value to customers.

The value comes from the business initiatives involved in moving to webenabled, collaborative end-to-end (E2E) processes. IT, although often the most expensive component of these projects, is an enabler, not an end in itself. It should be the business driving the technology not the technology driving the business. Research has shown that there is no automatic correlation between the amount of money spent on IT per employee and company profitability, although if done well spectacular results can be achieved. Companies must insist on quick payback times, thorough business plans and careful, regular pre- and post-implementation analyses of all major technology projects. According to Strassmann:

*Companies are finally fed up with the escalating costs of IT through incompetent implementations. IT must be put into the hands of people who are competent to deliver and it has to be taken for granted. It must be available when you need it, how you need it, cheaply, reliably and securely. Companies need to worry about how to use it, not how to manage it. From now on just watch the economics and the risk, not the technology.<sup>4</sup>*

## THE TECHNOLOGICAL, FINANCIAL, LEGAL AND RISK MANAGEMENT CONSIDERATIONS

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A typical large company has 30–50 separate applications which are not integrated. The need to connect to customer and supplier systems has exacerbated this problem and left companies with a large number of incompatible systems. With wholesale replacement of systems not often a viable solution, Web standards and services and enterprise application integration (EAI) middleware are providing an automated, cheap alternative to labour-intensive point-to-point integration. To facilitate this integration underlying systems do not have to be changed but business logic needs



to be separated from data and the presentation layer has to be split off. This is because it is no longer possible to predict the nature of the device that may be used to contact the company, e.g. PC, handheld computer or mobile.

Equally, there is a need for a sound, dynamic security policy, which is embedded in the corporate culture combined with an ongoing risk assessment and mitigation process, including business continuity, in addition to the more obvious physical and technical tools such as firewalls. The challenge is to achieve maximum functionality within an entirely secure environment by including security in the design.

## END-TO-END (E2E) BUSINESS PROCESSES

Just as companies are recognizing the benefits of selling directly to consumers over the Web, companies are now applying disintermediation to their own corporate structures. An increasing number of companies are seeing the benefits of employing a self-service approach to HR and employee information, leading to a growth in enterprise portals. According to Wal-Mart's CIO, in the last ten years the driver of change has made the transition from technology to information.<sup>5</sup> What is really strategic is the use of the information and how it is exploited and maximized. Wal-Mart is in a business that competes at the speed of information, so it must be presented in such a way that it drives execution and improvements in the business. Martin Butler believes that two-thirds of the value of large companies is made up of information and knowledge and to overlook this issue is to devalue the business.<sup>6</sup>

Successful customer relationship management (CRM) is about giving the customer a better experience, hence enhancing the company's chances of retaining the lifetime value of that customer and acquiring new customers. The goal of CRM is to understand who the most profitable customers are – essential for both online and offline business. The Web is the ideal tool internally to tie together the disparate, product-based systems that contain customer data, and externally it can provide all customers with a similar and consistent experience, whatever products they buy. Integration of CRM with enterprise resource planning (ERP) and supply/demand chain management (S/DCM) are critical to success, especially supporting systems like order fulfilment, logistics, inventory management and electronic bill presentment and payment. The aim is to give the customer a seamless experience.

The supply chain in many organizations can consume well over 50 per cent of a company's operating expenses. It is therefore an obvious area to explore and exploit in the search for business systems improvement. When Microsoft adopted e-procurement the average transaction cost was reported to drop from £145 to £5.

## HOW TO ANALYSE, RE-ENGINEER AND MANAGE BUSINESS PROCESSES

The use of process-based management as the basis for managing the business was accelerated in the 1990s by the large number of ERP implementations within organizations and their use of a process-based philosophy. Over the last ten years, process-based techniques (PBT) have evolved from being used as just one-off tools applied for a particular purpose within the organization, such as costing or business improvement, and have become an all-embracing advanced planning, monitoring and control system which encompasses quality management philosophies – business process management (BPM). The quality initiative Six Sigma is sweeping the US, with business leaders in a quest for operations performance improvement. For peak performance, companies should assign process owners and position Six Sigma as one tool in the context of a holistic and strategic business process management approach.

*Whether designing products and services, measuring performance, improving efficiency and customer satisfaction – or even running the business – Six Sigma positions the process as the key vehicle of success. Research has shown that the costs of poor quality (rework, mistakes, abandoned projects etc) in service-based businesses and processes typically run as high as 50% of total budget.<sup>7</sup>*

In 1995, 62 per cent of UK managers were affected by some sort of organizational change programme: in manufacturing and financial services it was running at 75 per cent, in utilities it reached 90 per cent.<sup>8</sup> In the twenty-first century change is a constant. For organizations which manage change skilfully, it can become the driving force that perpetuates success and growth, with every change presenting a new opportunity to increase efficiency or to build the business. But all too often change fails as companies do not rise to the challenges it brings.

# The Strategic Benefits of Collaborative, Web-enabled Business Process Management

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# The strategic benefits of business community integration

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## THE BEGINNINGS OF COLLABORATIVE COMMERCE (c-commerce)

The roots of automated business trading links can be found more than 20 years ago with electronic data interchange (EDI), which has enabled larger organizations to carry out automatic transaction and information transfers.

### Case study 1.1

#### Procter and Gamble

The move towards closer collaborative trading relationships began in 1980 when Duane Weeks, a *Procter & Gamble* brand manager, led a team that prototyped 'continuous replenishment', automatically shipping Pampers to the warehouses of Schnucks, without the grocer needing to place orders.<sup>1</sup> The prototype was broadened by P&G vice president of customer services, Ralph Drayer, who, not deterred by K-Mart's rejection of the idea, approached Wal-Mart's Sam Walton and sold him the concept in 1988. Today, P&G software and process design is the industry standard. Drayer explains the road to P&G's success in establishing jointly managed processes between supplier and customer as follows:

- *The importance of a trusting business relationship with your counterpart.* It was a case of moving from an adversarial win/lose trading relationship that was frustrating, time-consuming and expensive, to one where both parties could demonstrate that they were interested in the well-being and success of the other. The 'continuous replenishment' project built trust and demonstrated the value of sharing information and focusing on the ultimate consumer. The benefits of improved service and reduced inventory were reaped by both sides and built the foundation for a greater collaborative trading relationship.
- *The necessity of having senior management support.* The chairman gave support to the early project and Inform software was purchased from IBM. The support continued throughout and his leadership stopped internal politics stifling the initiative.
- *The challenge of changing the customer's culture as well as your own.* It was necessary to persuade Wal-Mart that P&G could manage its inventory better than they could themselves. For example, they had to learn to receive trucks immediately they arrived, when it had been not unusual to see hundreds waiting to be unloaded. In effect, the mechanics of scheduling had to be rethought.
- *The move from continuous replenishment to collaborative planning, forecasting and replenishment (CPFR).* It became apparent that it was necessary to go beyond the customer's warehouse and start using actual point-of-sale (POS) data. The linking of demand planning to supply planning results in a process that resembles a pipeline that is continually flowing rather than a static warehouse – joint business planning, promotion planning, sales forecasting, order forecasting and promotion evaluation.

## THE VIRTUAL ORGANIZATION

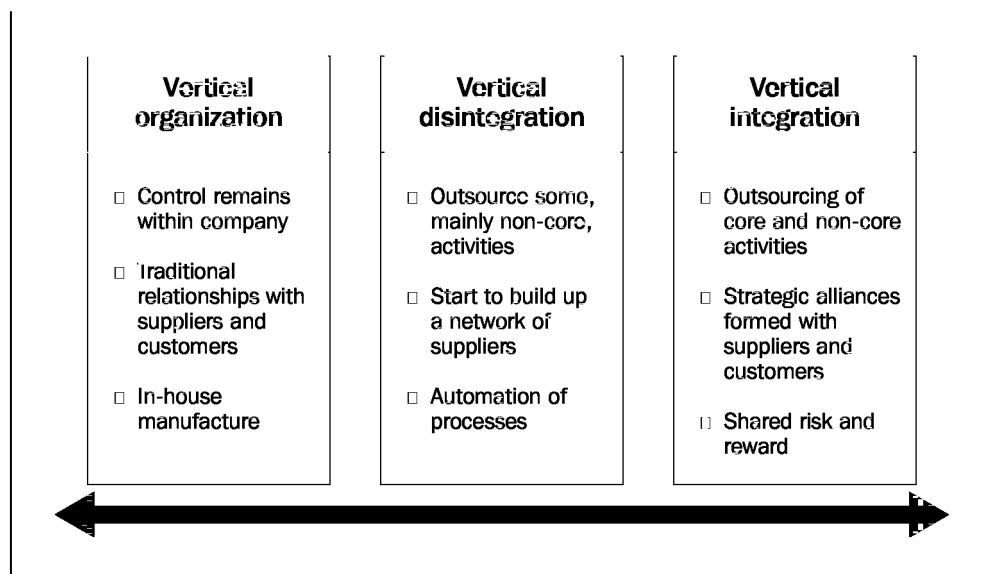
Twenty years later, with the move towards greater collaboration and increased outsourcing of both core and non-core activities, companies are becoming virtual organizations. This is an organization that uses information and communications technology to allow it to operate without defined physical boundaries between different parts of the organization and its partners and suppliers. The result should be a more responsive and flexible company with greater market orientation.

Kraut et al.<sup>2</sup> suggest that the features of a virtual organization are as follows:

- processes transcend the boundaries of a single form and are not controlled by a single organizational hierarchy;
- production processes are flexible with different parties involved at different times;
- parties involved in the production of a single product are often geographically dispersed;
- given this dispersion, coordination is heavily dependent on telecommunications and data networks.

Figure 1.1, the virtualization continuum, shows that the choices can be viewed as a continuum. This continuum starts with the traditional vertical organization where control remains totally within the organization, and through a stage of vertical disintegration often termed supply chain disaggregation where the company moves to outsource some, generally non-core, activities and to build up a network of suppliers, focusing on its core activities and the automation of its processes. This virtualization process eventually results in strategic alliances being formed with suppliers and partners and a reliance on third parties to deliver the product.

Figure 1.1 The virtualization continuum





Branded goods suppliers, notably in the telecommunications and hi-tech sectors, are reinventing themselves as marketing operations, requiring an emphasis on collaborative product design and configurable products tailored to markets and individuals. In addition customer analytics provide price and revenue optimization techniques that look at elasticity and each customer's unique willingness to pay, delivering increased profitability.

In 1978 the book value of financial and physical assets on average equalled some 95 per cent of the market value of an organization. In 2001 it is nearer 20 per cent. The other 80 per cent is derived from intangible assets/intellectual capital, such as, knowledge, brands, research and development, intellectual property, reputation and relationships with employees, customers, suppliers and business partners.<sup>3</sup> Tangible assets like property can be leased and manufacturing outsourced. Companies like Nike, Benetton and Cisco can be argued to have more value as virtual companies than if they owned their own production facilities.

## PARTNERSHIPS

As businesses move towards virtualization, the forming of partnerships is of the utmost importance. Examination of supply/demand chain strategy should not just focus on automating and integrating existing supply chains but instead on fundamentally questioning the basis of relationships with suppliers and distributors. According to Stuart and McCutcheon cost is the main driver for partnership management but the traditional approach of disintermediation is no longer sufficient.<sup>4</sup> The traditional approach suggests:

- a focus on core competencies;
- a reduction in the numbers of suppliers;
- the development of strong partnership relationships built on shared information and trust with the remaining suppliers.

When reviewing partnerships, companies need to decide the options for the extent and control of the supply chain process. The decision will depend on the objective to be achieved:

- If the objective is cost benefit, then a relationship with competitive tension is required like competitive tendering, short-term contracts or spot market and auctions, e.g e-marketplaces.
- If value-added benefits such as improved delivery speed, additional design features and customization are required then the arm's length approach is not appropriate. Strategic alliances, investment stakes or cooperative partnerships like profit-sharing partnerships, long-term contracts and preferred suppliers are the possible

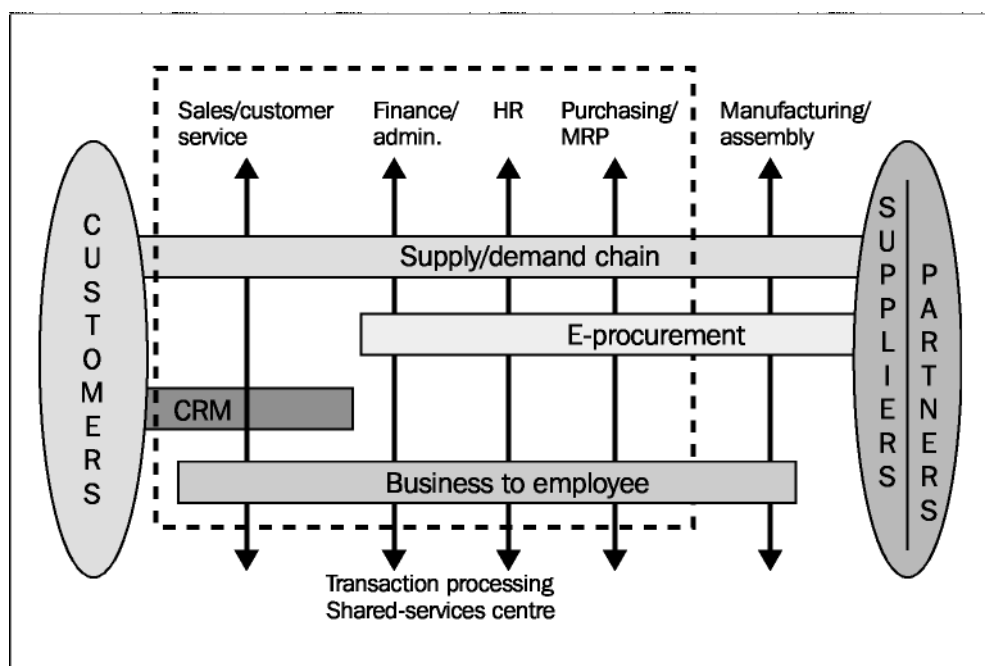
options. An example of such a strategic alliance would be the new c-business solution from Cable & Wireless, Compaq and Microsoft called a-Services.

Losing control of the process does not preclude an ability to exert strong control over the outputs of the process. As the depth of the relationship between partners increases then so does the requirement for exchange of information.

## END-TO-END BUSINESS PROCESS MANAGEMENT

An E2E BPM strategy demands much more than software and web technology to succeed, as we learnt from Procter & Gamble. Equally important to this revolution is the complete change in culture needed to form successful collaborative relationships between functions within the enterprise and with customers and suppliers and the need to re-engineer business processes. This new process-based structure and culture within organizations has been evolving over the past decade, resulting in departmental boundaries between support functions being broken down. The structure at the start of the twenty-first century looks very different, with operational departments set up as strategic business units (SBU) and back-office functions often incorporated into a shared service centre (SSC). The SSC might well be located in, say, India or another economically advantageous geographical location, with all other non-core processes, headed up by a chief operations officer (COO) (*see* Figure 1.2).<sup>5</sup>

**Fig. 1.2** Business process web-enabled shared services



This shows how the business typically interacts with the three main end-to-end (E2E) processes as they become web-enabled:

- the supply/demand chain (B2B2C) incorporating e-procurement (B2B);
- the customer relationship process (B2C);
- the employee process (B2E).

These E2E processes are revolutionizing business practices (*see* Part Three, pp. 69–139).

**Fig. 1.3** The development of technology-driven finance

Organization	Manual based finance	Centralized finance	Devolved finance	Shared service centres	Web-enabled shared services	Virtual organization
Technology	Manual financial and cost ledgers	Big-box computers	Local servers, PCs	Global enterprise-wide ERP	Fully integrated end-to-end processes	Lights-out processing
Reporting	Typed reports	Standard printout	Spreadsheet reporting packs	Electronic reporting	Decision support systems	Business intelligence systems
	Pre 1970s	1970s	1980s	1990s	2000s	2010s

Figure 1.3 shows how technology has evolved from department-specific systems through enterprise-wide to lights-out E2E processing, and with it the evolution of information to decision-support and then to business intelligence. This evolution is predicted to be complete by 2010 when the need to house an SSC as a separate processing unit will become unnecessary. Automated auditing processes, known as ‘auditbots’ are now being embedded into ERP software to audit all routine transactions. With the fully automated and integrated model, the only manual intervention that will be needed to operate the processes in the non-core functions will be web and application systems maintenance and audit and exceptions management when a problem occurs.

BPM software is now being developed to address the ever-growing pressures that face business users today – allowing data to be passed between disparate operating systems, converting data into business intelligence, managing application-to-application integration and application-to-human interactions. The Butler Group reports that regulatory bodies, such as the Business Process Management Initiative (BPMI), are encouraging the use of standards to support the technology.<sup>6</sup> The key issues for BPM are:

- to provide the ability to respond to change whenever and wherever it occurs;
- to provide business users with application-agnostic solutions where the process-centric approach to development overrides the restrictions, imposed by back-office and legacy systems;
- increasing profitability, reducing error and cycle times;
- the automation wherever possible of manual processes.

Business process analysis requires an understanding of the activities involved in the overall processes and the drivers of cost within those activities, e.g. the cost of ensuring that the systems on which the business depends are kept running 24 hours a day, seven days a week. Once in place the effective management of those processes is needed to ensure that they are delivering to optimum performance (*see* Part Four, pp. 145–222, including Chapter 15 on change management, which is the key to successful re-engineering).

### **Case study 1.2**

#### **INTEL**

Intel,<sup>7</sup> the \$26 billion US chip giant, had already started to improve the effectiveness of its Accounts Payable department, which handles 60 per cent of the firm's transactions (about 1 million a year) and 75 per cent of the value of payments for Intel, by implementing the latest EDI and imaging technology. Richard Taylor, corporate controller, wanted further improvements and put forward a plan to move the whole operation to a single low-cost centre such as India. He gave his team three months to come up with a better alternative.

Jeff Lupinacci, head of the BPR project, decided that this was not radical enough as a solution and proposed 'lights-out' accounting. The process could be reduced to confirmation of a purchase order and confirmation of receipt – the invoice was superfluous and could be eliminated. The aim was to automate those two mechanisms by using web-enabled IT solutions. Under the new system, when Intel staff want to buy something, they access their firm's web portal – which contains catalogues from authorized suppliers that list prices, availability and contract terms – and place their order online. Once goods are received, they enter a confirmation onto the system, which automatically triggers a payment. The average cost per transaction was reduced from \$8 in 1999 to \$1 in 2001.

There are four main types of payment – direct materials, manufacturing support products, services and consultants/temporary staff. Fortunately, the team was able to 'piggy-back' on existing projects like e-procurement and EDI. Internal controls were built in for controlling access to accounts payable data and ensuring that security was robust enough to guarantee that payments were made only when goods were received. Hard copies of invoices are kept for use in countries where it is obligatory.

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**Case study 1.3**

## Cisco Systems

Cisco<sup>8</sup> employ 40,000 people worldwide with revenues in 2000 of \$18 billion. Cisco's technology – and more importantly its management ethos – allows it to close its books in 24 hours – a virtual close. It was management's determination to get better information faster to give the company competitive advantage that forced the changes. It helps that 90 per cent of Cisco's orders are received electronically and filtered through an Amsterdam office that acts like a European SSC for revenue purposes, and that it sells indirectly through a few hundred partners.

For example, when an order is received for a 'lower end router', it will go electronically into the master scheduler in the database in San Jose. It then goes onto the production line at an outsourced company in Scotland and is shipped to the customer – it never physically goes near Cisco. Cisco owns only two of its 40 manufacturing operations – the rest are run by partners, who participate in Cisco's supply chain. Less than a quarter of all orders actually touch Cisco – most are fulfilled directly by partners. Cisco owns the designs and software that control its products, while the rest is in the hands of its manufacturing partners and resellers. This makes Cisco as near as you get to a virtual corporation, yet it is the third most valuable company in the world today.

Cisco has an EIS that operates like corporate telemetry. Key data is available on Cisco's intranet the next day and accessible for managers throughout the company to drill down, and the sales people forecast on a weekly basis. Part of the sales team's remuneration is based on minimal divergence from linearity, which discourages tail-end bunching and all the advantages that having evenly spread orders brings – process stability.



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# E-business strategy

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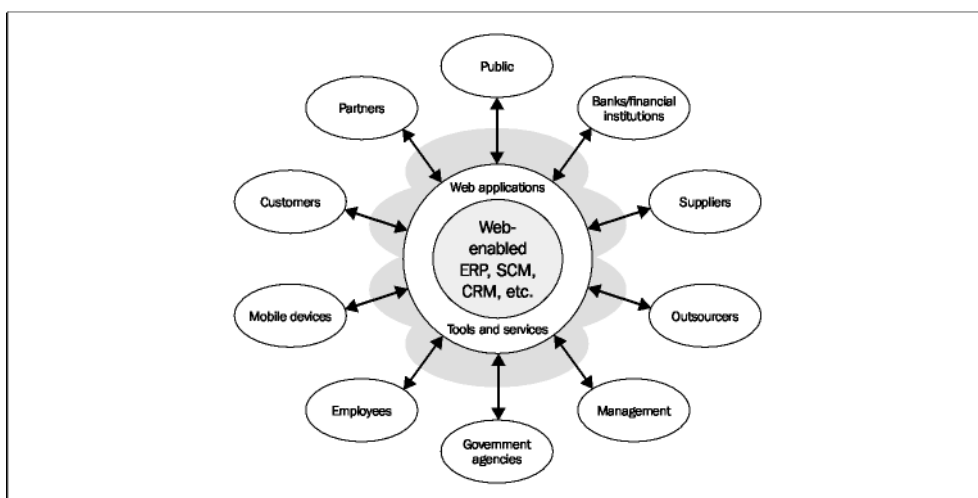


## THE WEB-ENABLED ORGANIZATION

The emergence of the Internet has opened up new possibilities and opportunities for organizations in the way in which they interact with their customers, suppliers, partners and employees. E-business can be defined as taking existing business processes, and applying web technology to make them more efficient through business collaboration and communication. E-commerce is causing organizations to fundamentally review how their businesses operate to satisfy customers at the lowest cost, resulting in the so-called ‘clicks and mortar’ approach by many traditional businesses, who are offering an Internet channel in addition to their traditional channels. Lessons learned from early adopters of e-commerce show that new skills are needed but these do not need to be separated from the rest of the business. Ford’s ConsumerConnect and e-GM have both now been integrated into the mainstream businesses. There needs to be cohesion between business processes and new technology. There is no doubt that organizations involved in B2C marketing must have the ability to know that the item being ordered is in stock and can be delivered in a short timescale. Even for those organizations without the pressures brought by selling over the Web, this ability is very attractive, particularly when it brings with it massive processing cost reductions, improved productivity and satisfied customers.

In an e-business, typically, orders can be placed directly by customers on the Web, then electronically processed via workflow techniques and passed via web-enabled links to suppliers to execute. Payment is then made electronically. The support functions are involved only where exceptions occur. The benefits of achieving seamless integration between the organization’s systems and those of its employees, suppliers, customers and other partners wherever they are geographically located is undoubtedly a challenge but well worth the work involved in making it happen (*see* Figure 2.1).

**Fig. 2.1** The web-enabled organization



Source: Margaret May (2002)

There is a need to have robust, internally integrated, business process-oriented systems as a prerequisite to connecting to the wider business community. The installation of enterprise resource planning (ERP) software (*see* Chapter 7, pp. 69–80), that was undertaken in the late 1990s by many larger organizations to automate the back-office, facilitates this requirement. These newly integrated ERP systems can now be web-enabled allowing E2E processes to extend outside the organization. This transfers the generation of source transactions to partners, suppliers, customers and employees, removing the need to input orders or invoices within the company at all. ERP and middleware integrated systems are now being linked to front-office customer relationship management (CRM) and supply/demand chain management (SCM/DCM) packages, which have automated these processes and produced even more strategic and operational efficiency and information for decision-making purposes.

### **Case study 2.1**

#### **Dell**

Dell<sup>1</sup> is one of the companies that has led the way in e-business. Dell's direct business model is at the heart of the company and it has three central elements:

- one-to-one relationships with customers;
- products that are built-to-order for each customer;
- the lowest cost structure of any of their major competitors.

Dell's cost advantage is driven by:

- a lack of mark-ups from the reseller channel;
- their close relationship with suppliers;
- inventory management;
- operational efficiency.

The virtual integration of their suppliers and customer orders helped inventory drop from 33 days in 1994 to 5 days in 2001. The Internet has enabled suppliers and their suppliers to have the most accurate, up-to-the-minute information about their products which Dell is selling; they have unique insight into volumes, quality issues and customer satisfaction in real-time via '[valuechain.del.com](http://valuechain.del.com)'.

Dell first started using the Internet to serve customers in the late 1980s, allowing the downloading of technical support drivers and information. It started selling systems over the Web, which accounts for 50 per cent of orders worth over \$10 million a day, in 1995 and now spans 27 European countries in 18 languages and includes:

- real-time online order status tracking;
- online ordering allowing 30,000 order configurations;
- technical support information with troubleshooting guides.

Dell's 60,000 corporate and public sector business customers are provided with '[PremierDell.com](#)', which is unique to each customer containing all aspects of the relationship including pricing, catalogue and reports. Dell is working with these customers to further integrate this into their ERP or e-procurement systems; for example, Aegon Group and Litton PRC have cut their time and cost of generating purchase orders with Dell by about 80 per cent. Dell also uses its intranet to interact with employees.

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## THE PUBLIC SECTOR

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In the public sector e-business activity is driven by the government, which has decreed that by 2005, 100 per cent of delivery of services will be by electronic means. This will be achieved in different ways – from adding a web front-end to introducing fully automated E2E processes involving back-end integration. The solution must improve the service to the citizen and reduce costs. In 2002 the Chancellor earmarked an additional £1 billion investment for government information technology in addition to the £1 billion for NHS IT already announced.

### Case study 2.2

#### Liverpool City Council

*Liverpool City Council's* Chief Executive, David Henshaw, explained that there are huge possibilities for cost reduction through e-government and that incremental improvement is no longer acceptable, citing Liverpool's overhauling of its services using technology to bring cash savings, improve the council's performance and reduce council tax for citizens.<sup>2</sup> In the past three years LCC has risen from third bottom in the Best Value performance league table to eighth, has cut £105 million a year off its cost base and reduced council tax by 3 per cent. One of the projects that contributed was the integration of nine human resources departments and eight payroll systems. The departments have been centralized and use an integrated Oracle HR and payroll system and call centre and a frequently-asked-questions (FAQ) page on the council's intranet. It gives one version of the truth instead of nine and is taking £2.5 million annualized cost out of this service. An e-procurement system has also cut the number of suppliers from 17,000 to 5,000 leading to annual savings of £5 million. LCC and BT signed a partnership in 2001, which establishes a joint venture – Liverpool Direct – to operate the council's customer call centre, the largest in the country.

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## MEASUREMENT OF VALUE AND RETURN ON INVESTMENT

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### Research

AMS conducted research into enterprise integration (EI),<sup>3</sup> which it defines as the effective integration of business processes, applications and organizations and the implementation of technical solutions to support integration. The findings indicate that there are major problems in the way that some of the 155 European companies surveyed are approaching EI. If they remain unchecked, they will inhibit companies from realizing top- and bottom-line business benefits or a return on very significant investment. AMS found that the majority of companies are approaching EI on an ad hoc basis and they estimate that 30 per cent of integration budgets are being wasted as a result of inefficient practices. The survey revealed that 34 per cent of organizations embark on projects without quantifiable objectives and 40 per cent cannot specify when EI projects will pay back. While fewer than 40 per cent of companies surveyed have a corporate team in place to coordinate implementation of an enterprise integration strategy, organizations will only see real benefits if they develop such a programme, mapping out clear links and dependencies between projects. AMS would encourage companies to:

- develop an enterprise-level vision for EI, endorsed at the highest level;
- define a robust, high-level strategy that will reduce the risk of failure or derailment while providing flexibility as business needs change;
- develop a watertight business case for each project;
- justify costs at the programme and project level and regularly review each against its business case;
- prioritize projects according to business needs to secure early returns in line with the strategy;
- leverage legacy systems and only fix what is broken;
- address the skills gap by choosing an integration partner with care;
- demand a robust methodology – the antidote to complexity;
- look for programme management and business consulting skills, as well as technical capabilities and legacy systems expertise.

The value comes from the business initiatives involved in moving to web-enabled, collaborative E2E processes. IT, although the most expensive component of these projects, is an enabler, not an end in itself. It should be the business driving the technology not the technology driving the business. Research has shown that there is no automatic correlation between the amount of money spent on IT per

employee and company profitability, although if done well spectacular results can be achieved. According to Strassmann:

*Companies are finally fed up with the escalating costs of IT through incompetent implementations. IT must be put into the hands of people who are competent to deliver (outsourcers) and it has to be taken for granted. It must be available when you need it, how you need it, cheaply, reliably and securely. Companies need to worry about how to use it, not how to manage it. From now on just watch the economics and the risk, not the technology.<sup>4</sup>*

Companies must insist on quick payback times, thorough business plans and careful, regular pre- and post-implementation analyses of all major technology projects. According to CFO Europe,<sup>5</sup> companies aiming to bring value to technology investments need:

- *centralization* to provide greater control and a helicopter view of an entire suite of IT investments;
- *a consistent methodology* to increase objectivity and measurability during the appraisal process;
- *realistic assumptions* to offer credible analysis covering a precise timeframe;
- *risk-adjusted calculations* to quantify how costs and benefits will affect return on investment (ROI);
- *accountability* to identify who is responsible for which benefit and cost in every IT investment;
- *benchmarks and metrics* to assess a project from the perspective of both the IT department and the end user;
- *a CFO–CIO partnership* to increase the alignment of technology spending with business strategies.

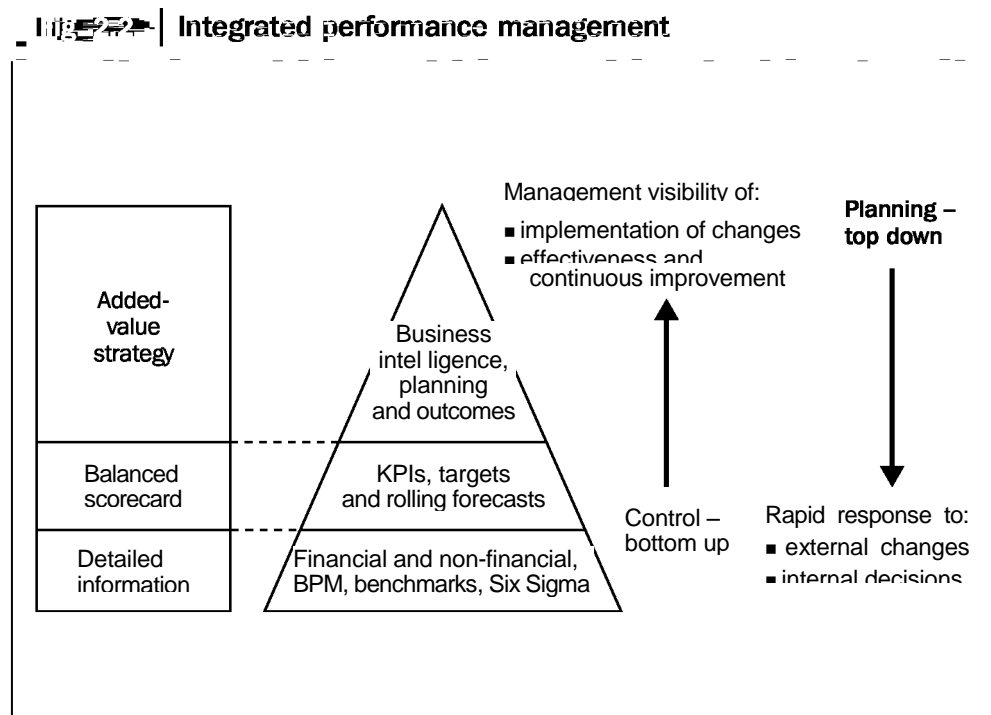
## The balanced scorecard

The value generated from these projects must be explained in terms of the business benefits, which will eventually result in savings or contributions to the bottom line. The key is to have the IT agenda articulated in a way that the business can understand. Benefits management recognizes that there is an adoption curve for new systems and practices, starting with users learning the new system, a crossover period and then a period when financial benefits start to accrue. At these transitional stages uptake, penetration and proper usage can be measured against targets.

Tools like the balanced scorecard (BSC) can be applied equally to measuring these benefits and this will help show up harder to quantify measures such as, for

example, shortening business cycles, reduced rework and innovation rates. The BSC developed by Kaplan and Norton is used today to translate strategy, by means of strategy maps, into a cause and effect led implementation plan that can be measured at each stage in terms of all business perspectives. These should include ‘innovation and learning’, e.g. employee preparedness, ‘internal business’, e.g. speed of fulfilment process, level of inventory held and the ‘customer perspective’, e.g. customer satisfaction, as well as the resultant ‘financial’ outcomes. The philosophy demands that the whole business involve itself in this process, taking responsibility for defining the benefits and cost justification of the overall project including the large element of IT involved.

The balanced scorecard approach can be applied in a matter of days, providing the company is clear on the knowledge level and understanding of the project is sound. If it takes longer then it is because the company is unable to clearly define issues regarding project scope, business strategy, market climate or departmental alignment. Extra time spent in these circumstances is not wasted but invaluable in saving the company from moving forward with a plan that is not fully thought through. Responsibility for managing the project to timescales and agreed budgets is a separate, but equally quantifiable, responsibility.



This subject, illustrated in Figure 2.2, is covered in detail in *Transforming the Finance Function*<sup>6</sup> along with other integrated performance measurement tools and techniques: benchmarking, value-based management, shareholder value analysis techniques like EVA<sup>TM</sup>, risk management and valuation of intangible assets.

**Case study 2.3****Delta Air Lines**

Delta Air Lines<sup>7</sup> prioritizes its Internet projects based on NPV and strategic value representing customer service – both are weighted to arrive at a total value score. This is then plotted against risk, which equals the size of the initial investment in the project, the resources required to develop and implement it and an assessment of possible technological hurdles, such as the rate at which the system becomes obsolete. The introduction of wireless Internet services that give customers quick access to a wide array of flight information went live in 2000. Delta assesses ROI in terms of both productivity and cost savings. The productivity metric helps in calculating NPV and strategic value, e.g. it estimates how many more revenue-producing calls (bookings) will be handled by customer agents as a result of wireless self-service and how many calls will be saved on check-in and seat allocation details.

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**Case study 2.4****National City**

National City<sup>8</sup> undertook an integration project to develop an EAI architecture to replace point-to-point connections between legacy applications. The IS payback was lower development and maintenance costs and faster deployment of new features. The enterprise payback was faster to market with new products, a reduced risk of failure during system upgrades and changes, and customers receiving consistent data in all channels.

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**Case study 2.5****Cabot**

Cabot<sup>9</sup> revamped front- and back-office business processes worldwide, supported by standardized and integrated enterprise software systems. The IS payback was getting better deals from vendors and savings on development and maintenance. The enterprise payback was global sharing and reporting of information, better service to global customers and e-business enablement.

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**Case study 2.6****Con -Way Transportation Services**

Con -Way Transportation Services<sup>10</sup> installed a data warehouse, CRM system, enterprise portal and web services connectivity to suppliers. The IS payback was that users can generate their own reports without relying on IS and that applications are easier to maintain and support. The enterprise payback was a single view of customer activity across the company's multiple business units improving service.

## OUTSOURCING AND APPLICATION SERVICE PROVIDERS

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### Outsourcing

In the second half of the 1990s, outsourcing deals moved into a second generation. No longer is the emphasis on highly prescriptive contracts, but instead on risk sharing, partnerships and joint ventures. CSC is quoted as saying:

*In the past, companies would ask how much of a contract would be value-added services, but never made any buying decisions on that. Now they are making decisions on the basis of what added value can be provided.<sup>11</sup>*

These arrangements recognize the shortcomings of earlier outsourcing contracts and, through various different innovative collaborative partnerships, have tried to overcome them. In particular, the inevitable conflict of interests and lack of incentive to save money and add value inherent in the old-style deals have been addressed.

#### **Case study 2.7**

##### Thames Water

Thames Water, in 1997, formed a joint collaboration with Accenture creating Connect 2020 to run Thames Water's supply chain. Wholly owned by Thames Water, the operation is run under contract by the consulting firm. The brief runs from negotiating the purchase of £300 million in goods and services a year to managing their fleet of lorries. A seven-year extendable contract includes Accenture getting a share of any improvements in working capital savings. Thirty payment and purchasing staff and 130 other employees were transferred. Savings have been substantial with £22 million shaved from the costs in the first two years. Quarterly reviews with a balanced scorecard are undertaken.

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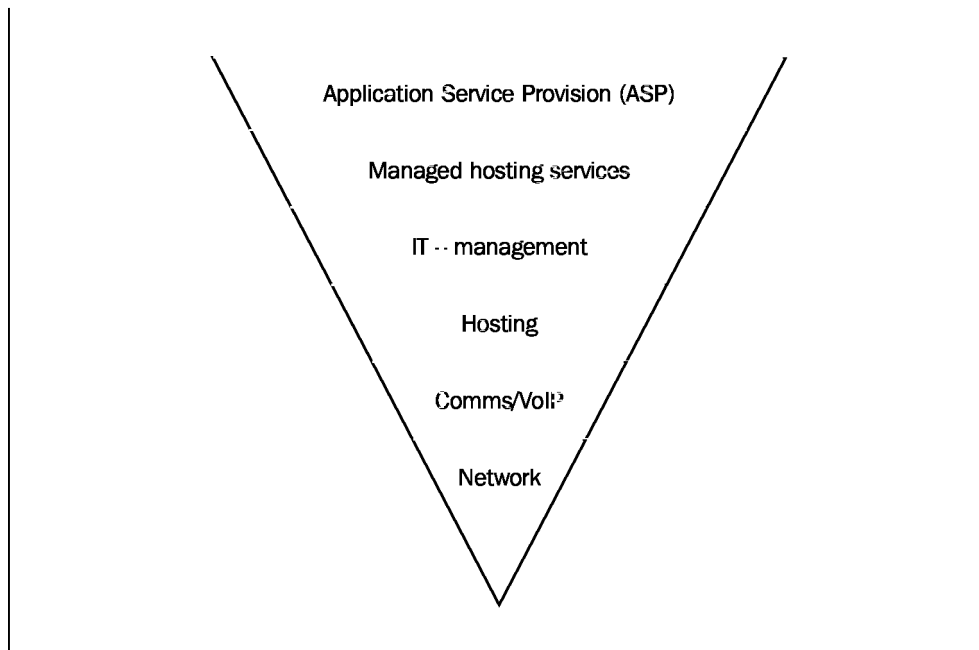
### Application service providers (ASP)

ASP rent out hosted applications over the Web. Hosting, at its simplest, involves a service provider hosting data on servers in a location outside the end-user organization's own facilities. The service provider manages the servers, network connection and other equipment required in a dedicated and secure Internet data centre. Hosting is increasingly including a complex array of e-business functions and value-added services. Gartner Group predict that outsourcing will become the preferred choice for hosting.<sup>12</sup> ASP enable a business to have access to applications that would otherwise be too costly to implement and run on an affordable rental basis. It is attractive to be able to keep up to date with the latest technology without having to undergo the pain of installing, maintaining and updating the



system. Many companies now provide Web hosting particularly aimed at the SME marketplace. The advent of e-business means that smaller organizations can compete more easily with larger companies and by using a web-hosting company they save the expense of buying equipment as well as ensuring that the server stays running all the time (*see* Figure 2.3).

**Fig. 2.3** Value-added outsourcing



## Costs

There are four ASP payment methods:

- per transaction;
- fixed contract, variable applications – a flat fee per person for multiple applications;
- fixed contract, standard applications – e.g. ERP, with cost per user;
- pay-per-use – based on total time users spend on the system.

Gartner estimate that companies can save 20–40 per cent on application costs based on estimates of internal systems support charges. The analysts IDC believe that by 2010 the market will grow to the point where practically all software will be rented rather than bought.<sup>13</sup> This growth will depend on ASPs providing the right combination of applications, services and infrastructure, facilitated now with entry into the market by big players like SAP, Siebel and Oracle. Oracle has teamed up with BT Ignite to lease its software E-Business Suite Online Any Place

throughout Europe where it will take advantage on BT Ignite's network of data centres. Companies wishing to use this service will not have to configure a single piece of software and could go live within ten days. In the USA this service costs between £200 and £500 per user per month.

### Benefits of outsourcing<sup>14</sup>

- *Service level agreements (SLAs)* – to maintain control of the company's infrastructure.
- *Scaling* – a managed service provider will have the expertise, resources and vendor partnerships to ensure that their customers can anticipate and plan for the impact of a changing business environment via capacity planning and new technology testing.
- *Lifecycle support* – from the outset to design to upgrade and support applications and business needs
- *Accelerating time-to-market* – speeds up the deployment of new and the re-tooling and re-scaling of existing applications.
- *Maximizing performance and availability* – expertise to deal with transaction loads and traffic peaks and support that ensures availability 24 hours a day, seven days a week.
- *Maintaining security* – economies of scale allow state-of-the-art safeguards.
- *Providing global reach* – national and global connectivity, support and management.
- *Cost predictability* – this focuses on the total cost of ownership (TCO) and spreads this as an annual fixed cost.
- *Focus on value creation* – technical resources are free to concentrate on new business opportunities, customer relationships and competitive differentiation.
- *Enabling flexibility* – the need to constantly change quickly to react to business needs is facilitated by a service provider.

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#### **Case study 2.8**

##### **BP Amoco**

BP Amoco went to the ASP Asera to implement and manage a new web-based ordering system for its specialist chemicals customers and benefited from a time-to-market of just 90 days to roll out this new channel.

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**Case study 2.9****Nissan North America**

Nissan North America has paid eCustomerCentric Solutions to host a sales-led management system that Nissan uses to distribute leads automatically among 153 car dealerships. This programme is tied to a CRM application from E.piphany, which is hosted by ASP users Interrelate. Steven Silver, director of e-business, attests that:

*The challenges of integration are present whether you're integrating your own system or integrating into systems that other people are hosting. That's partly why you pay an ASP – so it's their headache instead of yours. But the tail shouldn't wag the dog. First I'm going to pick my application, then my search for an ASP will be predicated on who has a proven track record in hosting the application. One good way to find the perfect host is to talk to the maker of the application.<sup>15</sup>*

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**Case study 2.10****Rolls Royce**

Rolls Royce, the global aerospace, defence, marine and energy group announced in 2000 that it was extending its relationship with EDS, which originated in 1996, to provide technology services and solutions, covering e-business and supply chain management – a deal worth \$2.1 billion. The focus of the initial phase will be enabling business integration and workshare collaboration. This will include e-business solutions, with plans currently for three portals covering supply chain, design collaboration and corporate information, involving ASP offerings. EDS is already responsible for Rolls Royce's IT infrastructure, network, systems and applications and end-user support.

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# Technological, Financial, Legal and Risk Management Considerations

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# Web-enabling technology

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## THE INTERNET AND THE WEB

The Internet is a powerful tool, allowing communication between millions of computers worldwide. Information is transmitted from client PCs whose users request services, i.e. effectively it operates as a large client/server system through local Internet service providers (ISPs). These ISPs are linked to larger ISPs, which in turn are connected with the backbones, which are national and international links – *the information superhighway*. The Internet provides the communications network and the standard mechanism for exchanging and publishing information on it is termed the World Wide Web (www or the Web).

The Web is accessed through a web browser which displays web pages of embedded graphics and standard document formats such as HTML and XML (*see p. 33*). All Web interaction is charged at the local rate. Developing Web technology has facilitated the building of web-based organizations with interconnectivity to employees, customers, suppliers and partners. Internet technology has enabled the growth of online business-to-business (B2B), business-to-consumer (B2C) and business-to-employee (B2E) communication. By being able to communicate in a common format and integrate back-end systems with new customer-focused applications, for example, Mondus operates a virtual account, where buyers and suppliers can view their transaction histories. The architecture allows it to integrate directly with the buyers' or suppliers' back-end systems and covers all stages from purchase to payment to delivery.

The Web facilitates:

- the Internet (public), intranet (internal to a company) and extranet (wider business network);
- speed and ease of communication, e.g. e-mail, document attachments;
- access to data on other organizations and learning – web pages;
- bulletin boards for questions and technical support;
- the opportunity to promote/sell products via a website – B2C;
- the ability to rent software applications – ASP;
- a quick, convenient, reliable method of transmitting data, facilitating business community integration (BCI), e.g. place/receive orders, software upgrades – B2B;
- enterprise portals enabling access to information – B2E;
- links to mobile devices, e.g. WAP – B2M;
- links to telecommunications, e.g. VoIP, VPN;
- hyperlinks, which enable links from one place in a document to another, or to another document or website – surfing;
- the integration of graphics and animation into pages;

- interaction through use of HTML forms, e.g. request or search for information or make comments;
- a synchronous communications tool allowing text-based chat between different users logged on at the same time – Internet relay chat.

## INTRANETS AND EXTRANETS

An *intranet* is a secure internal network where access is limited via firewalls to members or employees of an organization, like a mini Internet. It is a network of computers set up to be closed to the outside world which:

- allows access to traditionally ‘difficult-to-access’ information to those within the company;
- allows occasional users of packages to access them without the need for package-specific training;
- facilitates information and knowledge management;
- facilitates access and distribution to remote offices worldwide;
- runs the same application types as the Internet, including e-mail and the Web;
- can provide animated instructions on how to sell a product or assemble it, price lists schedules, stock levels, etc.;
- carries information such as phone directories, organization charts, pictures of staff, procedures and quality manuals, staff bulletin boards, newsletters, vacancies, training, etc.

So successful are these systems that companies now have to use strict codes of conduct and ‘filtering’ systems to ensure that only priority information is received and read (*see* e-mail management policy on p. 60 and content management systems on p. 90).

An *extranet* is an extension of an intranet and can be described as a secure network of users that encompasses organizations and people outside the business, set up to facilitate B2B and B2C activity. Extranets would be used for activities such as tracking delivery of goods, ordering products from suppliers or customer assistance from a supplier online. By means of an extranet suppliers can also receive proposals, submit bids, provide documents and collect payments.

## INTERNET STANDARDS AND PROTOCOLS

- *HTTP (hypertext transfer protocol)* has become the standard which defines the way data is transmitted across the Internet between web browsers and servers.

- *HTML (hypertext mark-up language)* has become the standard format used to define the layout and text of web pages for presentational purposes.
- *XML (extensible mark-up language)*, developed by the World Wide Web Consortium (W3C), has become the industry standard for transferring structured data. XML, the specification that labels textual content on the Web, can allow a business to extract data from back-end systems and put it into a standard format that other businesses can ingest directly into their own back-end systems. Most major software companies, including IBM, Microsoft, Sun, SAP and Oracle, are committed to the support of various XML standards. For example, with an XML-based accounting system, an XML invoice can be generated and despatched by e-mail to the customer, who can open it or automatically update their accounting systems.
- *SOAP (simple object access protocol)* is an XML-based protocol that is rapidly becoming the industry standard for describing the content of an XML message and how to process it, enabling application-to-application communications across platforms. It is used in web services – see p. 34.
- *XBML (extensible business mark-up language)* and *XBRL (extensible business reporting language)* applies XML technology to business reporting, benefiting the whole business reporting supply chain from those that prepare the data to those that use it. With XBRL each piece of financial data posted on the Web is given a digital tag to explain what it is, e.g. revenue figures have one sort of tag, while profit figures have another, thus enabling search engines to quickly and easily retrieve relevant data. It is used to publish, distribute, analyse and exchange financial statements digitally. XBRL relies on existing accounting standards. Reuters was the first European company to publish its results using XBRL over the Web in October 2001.
- *eBIS-XML* is an initiative from BASDA (the Business and Accounting Software Developers Association) and operates at the transaction level. Like EDI (see p. 51), it enables the direct exchange of purchase orders, invoices and other business documents in computer readable format. The beauty of eBIS-XML is its simplicity. The information is sent as a standard e-mail attachment and the user's accounting system automatically strips out the e-mail and populates the relevant files with the data it contains. This means that what used to take years on EDI can be done in days and is accessible to all, including smaller organizations. Participants include Sage as well as SAP and Oracle.
- *Microsoft's BizTalk* comes in two parts. The first part is the framework, where developers can upload their schemas, so everyone can see and download them. The second part is BizTalk Server, which will act as a translation engine between vendor systems, provided each vendor has developed its own front-end schema to BizTalk. It will convert messages into XML-based schema as well as

acting as a routing engine and passing the message on. This includes taking EDI and translating it into XML.

- *TCP/IP*, the transmission control protocol, is a transport layer protocol that moves data between applications. The Internet protocol is a network layer protocol that moves data between host computers. These are part of a larger set of standards known as the Open Systems Interconnection (OSI).

## WEB SERVICES

Web services is a term applied to both the tools used to build easy-to-integrate web-based applications and to the underlying technology standards on which they rely. These services are really an emerging set of protocols and standards that will allow software programs to describe themselves to each other and integrate with each other without the handcrafting that has marked most systems integration efforts to date. Combining lessons learnt over years of project developments by internal and external IT staff with the openness of the Internet and the result is the ability to use these already developed 'solutions' to put together new applications in a short space of time. Web services are reusable software components available over the Internet, e.g. to calculate a price, carry out credit checking or provide an accounts payable routine. What excites many IT professionals is how easy it is to build and integrate software using web services, like snapping together pieces of Lego. Programmers already schooled in objectoriented design find the transition easy.

While installed applications tend to be robust, inflexible, proprietary and expensive, web services are much less robust, flexible, open and affordable, with hosted applications falling somewhere between the two.<sup>1</sup> Web service networks are designed for corporate users that need high performance secure data and transactions, recombinant web services sutured together from smaller component web services, performance monitoring, transaction status reporting and service management. For example, if a company wanted to let a supplier access inventory levels in its ERP system, instead of building a new application with a separate interface and integrating it with the ERP system, the company could wrap the ERP inventory functionality in XML, expose it quickly as a web service and deploy it to the supplier over a web service network. Because it is reusable the same code could be used again for similar services for other suppliers. It permits the suppliers to securely access the data, authenticates users and improves performance by carrying out tasks such as XML compression. They are logic

layers that run on the Internet or a customer's WAN and customers lease the services. ASPs can host web services over a web service network so they can offer both web and hosted services.

Web services are likely to result in some companies adopting a 'virtual IT' department while others turn in-house IT into a profit centre. Web services are expected to creep into organizations gradually, incorporated into new applications or working quietly behind the scenes in software that companies rent from ASPs. By everyone writing to a web services standard when integrating supply chains, EDI and other BCI projects this revolution will start to leap forward.

## Open standards

- The *Universal Description Discovery and Integration (UDDI)* project, supported by Microsoft, IBM, Ariba and many other IT companies and users including Ford, Boeing and BT, is a widely supported set of standards. The UDDI business registry is a series of public databases in which companies record the web services they offer – this can be interfaced either by people or application programs looking for such services and integrating them into other applications.
- *SOAP* applications built with web services standards will describe themselves to each other so they can link up automatically (*see p. 33*).
- *Microsoft's Hailstorm* is a suite of web services that authenticate the identity of users, establish what rights they have to use particular services and arrange payment.
- *Microsoft's .Net 2.0 Web Services platform* focuses on integration with Windows 2000. It has open architecture giving customers flexibility and a renewed focus on application integration and B2B. Applications can display their content through Microsoft Office and .Net, allowing smaller companies to interact with large CRM packages like Siebel without a big infrastructure upgrade or software expense – anything that is XML-based.

### Case study 3.1

#### CGU Life

CGU Life<sup>2</sup> use PlanLab from the ASP Impact Technologies. A software application gathers financial data about a prospective client, sends that information via the Internet to a secured website, where a CGU Life analyst can pass it through several applications at once, creating an estate plan. Working with [Microsoft.Net](#) products, Impact developers achieved a fourfold boost to productivity, without undergoing significant training.

### Case study 3.2

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#### Royal Dutch/Shell

Royal Dutch/Shell<sup>2</sup> in conjunction with the UK government and with help from IBM are now passing volumes of data automatically that was once provided to the government in paper

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### Case study 3.3

form, using web services communications protocols.

#### Storebrand

Storebrand,<sup>2</sup> a financial services company in Norway, began building the infrastructure for its web services using IBM's WebSphere platform in the late 1990s, spending much of the time building an application server with the aim of linking web systems to the company's database. The work invested over this time has meant that its specifications for web services were published for their first project in 2001 enabling their customer database to 'talk' with the payroll applications of companies enrolled in its pension plans, using a messaging tool called Lotus Domino to authenticate identification. With this framework in place creating a new web service simply entails rewrapping existing programs without reprogramming. As part of the company's general 'good architectural thinking' the CFO expects web services to play a large part in helping its application development and management costs to be reduced by as much as 75 per cent.

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## ENTERPRISE APPLICATION INTEGRATION

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The need to be able to seamlessly integrate many different systems both inside the organization and outside with partners', customers' and suppliers' systems is paramount to the success of an e-business strategy. A new generation of middleware designed for enterprise application integration (EAI) frees developers from writing routines to handle reliable data transfer and from enforcing transactional integrity. EAI packaged applications are available to link ERP, CRM, etc., incorporating logic to link the functionality between the different systems. This enables those legacy systems, still critical to the success of the organization, to be linked to the enterprise-wide systems to provide true business integration. Introduced in the mid 1990s, EAI provides an orderly way for companies to update, coordinate and consolidate interfaces from a single hub, or 'bus' in EAI jargon.<sup>3</sup> Because all the applications feed into the hub, a lot of integration work is streamlined and automated, dramatically reducing the number of interfaces. EAI packages have open architecture and graphics and differentiate themselves by the number, quality, functionality and level of intelligence of their adapters. Adapters are the software components which provide formatting, data

transmission and validation, e.g. can insert real data in real time into the correct accounts payable field or invoice line item of a target application.

## Research

Over the past four to five years EAI products have moved from just delivering the services to do the integrating to developing a much more robust product that automates all the coding. Research by Mercator Software has showed that 26 per cent of programming time is devoted to the integration of business applications and unnecessarily antiquated methods like hand coding (known as point-to-point) are still being widely used. As organizations shift from PCs to handheld mobile (m-commerce) and wireless devices it will be necessary for 95 per cent of the business's data to be accessible over the Web.

VNU polled 240 IT leaders at medium and large organizations in all sectors across the UK and found a marked lack of preparedness for application integration.<sup>4</sup> While most IT managers believe integration can cut costs and improve productivity and flexibility, most struggle to gain business backing – only 15 per cent have a budget for integration, even though experience shows that 30 per cent of IT spend is actually on integration. At Microsoft's launch of BizTalk Server 2002, it was argued that companies need to establish centralized, in-house integration teams. Armed with the right middleware, they can make a huge impact on corporate performance. An AMS survey in 2002 of 128 companies in Europe that rely heavily on technology, found that only a third of the respondents were using high-end EAI tools. Another third were using low-end integration tools or middleware and the rest still chose point-to-point integration.

One of several reasons for this trend is lack of awareness, with only about 5 per cent of companies in Germany fully understanding what EAI is and what it is capable of doing, according to IT experts MetaGroup.<sup>5</sup> Gartner believe that another reason is that none of the vendors offer a uniform set of features, making it difficult for companies to assess and compare products. Tibco, SeeBeyond and IBM are the largest worldwide players, but none have more than 15 per cent of the market. These are followed by WebMethods, Vitria, Mercator and BEA systems. Then at the low-end there are tools such as Microsoft's BizTalk. Differences in cost vary from €500,000 for full-blown EAI tools to €50,000 for the low-end range, which are adequate in smaller, simpler scenarios.

### **Case study 3.4**

#### Jefferson County

Jefferson County<sup>6</sup> in Denver had an annual IT budget of \$4 million, 25 per cent of which was going towards maintaining 160 applications. New integration software could reduce the maintenance cost by automating all the point-to-point integration and it would speed up the



development of new online information services. They managed to purchase part only of the WebLogic Integration. After one year they reduced the cost of integrating their ERP system with their Oracle database by 65 per cent as well as providing high-quality online information for residents.

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### Case study 3.5

Telia

Telia,<sup>7</sup>

the Swedish Internet and telecom company, found itself with over 1,000 applications and customer service was starting to suffer as a result. Since September 2000 they have been running an 'Enterprise Nervous System' with Tibco EAI at the hub, replacing all old point-to-point interfaces. They claim an ROI of 149 per cent, thanks largely to the reduction in the number of interfaces that have to be built and maintained, with a payback period of nine months.

### Case study 3.6

Coats

Coats,<sup>8</sup> the thread manufacturers, had a valued customer who wanted to be able to check inventory and order goods using its own coding system which was different to theirs – and they wanted this in six weeks. Coats chose a web-based integration product, Verastream Integration Broker, from WRQ, which provided a non-invasive framework for combining IT systems. The integration is done at the business process level, leaving the original systems untouched. The project was finished on time and at a fraction of the cost of traditional methods.

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## DATA STORAGE

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According to IDC, corporate demand for storage services is rising nearly 80 per cent a year worldwide.<sup>9</sup> With storage costs making up between 30 and 50 per cent of a company's IT budget, the good news is that the raw cost of physical storage, i.e. disk drives, tape systems, etc., is falling by up to 50 per cent a year. The bad news is that storing and managing data costs almost three times as much as acquiring it. This means that the traditional solution of buying more direct attached storage (DAS) has shortcomings when it comes to dealing with e-commerce, which requires faster and wider access to data. Two new models have emerged to solve the problems of substituting a one-to-one link between a computer and storage unit with a many-to-many arrangement:

- *Network attached storage (NAS)* consolidates file storage in a single-purpose 'appliance', which literally plugs into a company local area network (LAN)

which is intended for file sharing or e-mails. It uses Gigabit Ethernet, a souped-up version of the local area network (LAN), which transfers data between storage systems or small computer system interface (iSCSI), which connects storage devices to computer systems.

- A *storage area network (SAN)* brings together bits of data as opposed to files, allowing multiple servers to share a single pool of storage devices arranged as a network. It is intended to sit behind applications like sales and finance and serve up data in response to queries, using a fibre channel as its method of transferring data between storage units in a SAN at speeds of up to two gigabytes per second.

The demands of information and e-commerce on the need for storage capacity has led to a new purchasing arrangement, particularly popular with e-tailers, called capacity on demand (COD). COD enables companies to buy or lease robust systems, but pay only for the capacity they use. If an online operator needs additional storage or processors, the customer is billed. Suppliers include Sun's Capacity Assurance Suite and Hewlett-Packard's iCOD.



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# Mobile and wireless technology

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## INTRODUCTION

Wireless means transmitting signals over invisible radio waves instead of wires. It is used from something as simple as making a phone call to the complexity involved in enabling the sales force to access information from an ERP application. It means new, more convenient ways of staying in touch with suppliers, customers and employees. Although mobile data is already bringing significant benefits to the supply chain, many businesses still fail to understand the technology's potential impact on profitability. A suite of mobile and wireless technologies exists today that are stable, available and relevant for use in the supply chain. According to Deloitte Consulting, organizations deploying the technology have enjoyed payback periods of under one year and ROI of hundreds of per cent – and this is without 3G (third-generation wireless technology that is packet based and always switched on).<sup>1</sup> The key to mobile's impact on the supply chain results from a faster flow of relevant information. The quicker that staff have access to critical data, wherever they may be, the faster decisions can be taken. A mobile powered supply chain can positively impact several key areas including:

- *Cost control* – faster and more accurate information and communications result in smaller, more precise inventories and cashflows.
- *Information accuracy* – removal of pen and paper at capture and validation improves accuracy.
- *Improved customer relationships* – improved and faster information is available on delivery dates and time, e.g. monitoring a delivery vehicle's location through GPS, with coordinates being relayed by SMS.
- *Time to market* – improved communication results in faster time to market, reducing stocks and enabling problems to be resolved more quickly. For example, mobile technology can speed the process where an engineer is informed by SMS, a diagnosis is made via wireless LAN or Bluetooth access to technical databases and new parts are specified and ordered via a GSM-enabled PDA.

In a recent book by Mackintosh and Keen<sup>2</sup> three areas where wireless technology can benefit companies are identified:

- *Knowledge mobilization* – encompassing decision-support applications, with wireless applications bringing information directly to staff wherever they are. For example, Coda's global accounting system allows finance executives to access and update data via WAP.
- *Logistics and supply chain management* – for example, Ford Motor Company uses wireless tags, antennas and location-based software at its manufacturing facilities around the world. When assembly-line operators need more parts, they simply press a button on the tag which alerts the replenishment system,

creating an order which results in delivery of the part to the operator. Delivery firms can give real-time information about the whereabouts of goods.

- *Customer relationship management* – with field staff often the first to benefit from wireless tools. For example, the Swedish National Board of Health and Welfare is using a combination of so-called ‘global positioning system’ technology and palm PDAs so that the agency’s paramedics can have direct access to a person’s medical history at the scene of an accident. Similarly, they can input data about the patient at the roadside.

## BROADBAND (HIGH-SPEED PACKET-BASED WIRELESS)

Bandwidth, which indicates the speed at which data is transferred using a particular network media (measured in bits per second – bps), is the most pressing problem for full mobile Internet access.<sup>3</sup> Providers are investing in new fibre optics, wireless equipment, hardware and software to increase their capacity to deliver broadband. Broadband-fixed wireless solutions will play a key role in situations such as dedicated point-to-point links where users need guaranteed bandwidth and fixed quality of service.

All major Swedish airport lounges, conference centres, hotels and other public places are equipped with local WLANs (wireless local area networks) or WiFi (802.11b standard) networks creating ‘hotspots’ that enable users to connect to the Internet with a simple PC-card in their laptop.<sup>4</sup> They offer unlimited access with data rates up to 200 times faster than initially offered by 3G networks – all at a competitive flat rate. WiFi technology is also expected to be popular with private residents and SMEs. WLANs are used primarily for data and make transfers at speeds up to 11 Mbps.

Uni-X Software OpenInformer is one product capable of following every byte that flows across a company’s wide area network (WAN) and assigns it to a particular application, user and business unit.<sup>5</sup> This provides incentive for managers to manage bandwidth used by individual staff and control it. Lufthansa is one company that uses this software to charge out all its bandwidth to its users. Another product is called NetCountant accountability from Apogee Networks.

## VOICE OVER PACKET NETWORKS

In order to send voice, the information has to be separated into packets just like data. Packets are chunks of information broken up into the most efficient size for routing. They are broken up, sent and then put back together. Two such protocols are described below.

## Voice over Internet protocol (VoIP)

New features allowed by broadband include real-time video and audio, VoIP, video-conferencing and rapid data downloads with no waiting which are resulting in companies replacing their PBX with a VoIP. Such converged voice over data networks have benefits, which include being able to save costs by utilizing:

- corporate WAN data links for voice traffic as well as data, considerably reducing costs to local call rates;
- the use of 'call me back' buttons on websites;
- blending with websites and supported by call centre based services – such services are also available through ASPs;
- video-conferencing, which, utilizing products like PictureTel, is now a viable alternative and used by organizations like Royal Bank of Scotland (RBS), with 13 video-conferencing studios supplemented by a further 6 facilities in directors' offices and another 30 desktop devices. RBS calculate that they save £60,000 a month in travel costs, primarily on trips between Edinburgh and London.

## Asynchronous transfer mode (ATM)

ATM is another voice over packet network protocol, which chops all its packets into the same size and can perform similar functions to VoIP. It is used in ISDN.

## GENERAL PACKET RADIO SERVICE (GPRS)

GPRS is the new standard for mobile communications and, like 3G, it is a packet-based system for wireless data transfer. GPRS is a bridging technology between today's voice-centric GSM networks, which are circuit-switched systems, and the long-awaited 3G networks (likely availability 2003). It is a bolt-on to the GSM but has the advantage of allowing users to share timeslots by slicing data into packets. Users are only charged for the packets used, not for the entire time of connection. Speeds are somewhere between GSM and 3G.

## High speed circuit switched data (HSCSD)

This is a circuit switched technology that combines multiple GSM (global system for mobile communications) timeslots into a single, high-speed data channel. It can be preferable to GPRS where dedicated, high speed is required.



## Bluetooth

This is best thought of as a near ideal way of transferring data over a short distance and a gateway technology to GPRS and the coming UMTS (universal mobile telephone system) networks for longer distances. Bluetooth can exchange data with another Bluetooth-enabled device. Two characteristics are that it has a small footprint on the chipset, which makes it suitable for mobile phones, and it has low power output. Taken together these features mean that it is easy to embed in all kinds of products from printers to headsets.

## WIRELESS APPLICATION PROTOCOL

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WAP is a set of protocols used for data delivery to wireless devices. WAP-enabled devices give users a limited version of the Web designed to work on the small screens of phones and PDAs (personal digital assistants). It is undoubtedly beneficial to give staff a single portable device that can roam seamlessly across mobile networks, fixed wireless networks and fixed wire networks. From a corporate perspective wireless means better and more efficient use of mobile data.

## MESSAGING

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- *Short message service (SMS)* is a text message sent or received to or from a mobile phone or the Internet, containing up to 160 characters. It was originally designed as a business-to-business medium, but it has been taken over by teenagers and is big business in Europe and Asia. The GSM Association released figures of 19 billion SMS sent during May 2002. It is predicted that SMS's share of mobile data transmissions will grow from 53 per cent in 2000 to 63 per cent in 2004.
- *Extended message service (XMS)* is the next generation. It is the acronym being used for both multimedia messaging services (MMS) and enhanced messaging services (EMS). Both will allow users to send ring tones, sounds, pictures, tunes, animations and text as a single message, with MMS having richer interaction and the ability to send a snapshot via mobile to server or mobile. XMS can be used for advertising campaigns and interaction between consumers.
- *Instant messaging (IM)* is a service that uses Internet technology to allow people to send text messages that are delivered in real time. Popular with both personal and business users, it gives users the ability to block messages from certain people and to have a conversation with more than one person at a time; attachments can also be sent. Providers include MSN, AOL and Yahoo!, but there is presently no interoperability between providers. Business users of IM use

it, for example, to ask questions of colleagues who are in a different location.

Business services have privacy and security standards built in.

- *Unified messaging (UM)* is one-stop shopping for all voice mail, e-mail and fax communications. A UM service lets you retrieve all messages with one phone call or web visit. E-mails and fax headers are translated into voice messages and they can be prioritized.
- *Peer-to-peer (P2P) computing* allows users to communicate directly, computer to computer, sharing files and data without using the server. It is necessary for the users to specify which information on their hard drive is to be public. This is new technology and has the drawbacks in a business environment of taking away control of information flows from central IT and raises questions about bandwidth and security.

#### Case study 4.1

Masterbit ■

Masterbit's

team of 70 consultants use unified messaging, where employees have a single in-box for e-mails, voice mails, SMS messages and faxes through a single browser interface, utilizing personalized web portals.

#### Case study 4.2

Bayer

Bayer has 1,300 mobile handsets operating on VPN and running on a Vodafone volume tariff.

#### Case study 4.3

Reitan Narvesen

Reitan Narvesen,<sup>6</sup> a Norwegian retail group with annual turnover of €2.7 billion, has its 17,000 staff able to access a Lotus Notes-based intranet via their mobile phones or PDAs. With 430 outlets in far-flung parts of Scandinavia managers used to struggle to make onsite visits – now they can be in immediate contact even when snowbound.

#### Case study 4.4

Volkswagen

Volkswagen uses radio frequency (RF) data tags to locate nearly finished vehicles more

quickly than staff searching on foot. The payback was within one year.



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# Electronic invoicing and payments

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## INTRODUCTION

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Electronic transactions and payments began before the Internet with electronic data interchange (EDI), which has been in use by large organizations since the 1980s to send bills and payments direct to suppliers in digital format. Interactive web browser based solutions that require only a web browser and Internet connection at the customer end are less expensive. The EU directive, which comes into force on 1 January 2004, permits companies in member states to use digital invoices rather than paper-based ones for tax and regulatory purposes, but still allows member states leeway to impose restrictions on use of the Internet to present and pay invoices. This will enable European companies to finally begin using Internet software developed for the purpose.

## ELECTRONIC DATA INTERCHANGE

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Transactional electronic interchange predates e-commerce in the form of EDI, which is the digital exchange of structured business information, particularly for purchase orders and invoices, between buyers and sellers. Financial EDI is the payment mechanism for transferring funds from the bank of the buyer to the seller electronically. Electronic funds transfer (EFT) is the automated digital transmission of money between organizations and banks, used by companies like Dell. Prior to the introduction of the Internet, EDI required the use of expensive proprietary value added networks (VAN). Internet EDI using XML (*see* eBIS-XML on p. 33) compatible standards and lower cost transmission through virtual private networks (VPN) or the public Internet is predicted by IDC to take 40 per cent of the EDI market estimated at \$2 billion in 2003.<sup>1</sup> With cost savings of about 90 per cent, EDI is now accessible to smaller organizations.

### **Case study 5.1**

#### **Flymo**

*Flymo*,<sup>2</sup> the largest UK lawnmower manufacturer, used EDI for linking to its largest retailers but until Internet EDI they could not link to the smaller retailers because of the prohibitive expense. Their EDI supplier, IBM, created its 'Internet for dealers network', which gives retailers two facilities: CD-ROM for offline ordering and a transmit screen via EDI or access via the extranet to place or check progress of orders and invoices online.

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## ELECTRONIC INVOICE PRESENTMENT AND PAYMENT

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EIPP software automates all the steps involved in making inter-company payments via the Web.<sup>3</sup>

*Benefits for sellers:*

- reduced day sales outstanding
- enhanced cashflow visibility
- faster dispute resolution
- improved information
- 50 per cent reduction in processing costs per invoice.

*Benefits for buyers:*

- more efficient invoice delivery
- improved relationship management
- better payment terms (possibly)
- improved information
- 60 per cent reduction in payment costs per invoice.

There are three EIPP models:

- *Seller direct* – the seller implements an EIPP application for all buyers to review, dispute and authorize invoice payments on its website. The seller controls the process and systems integration and relies on its existing banking relationship.
- *Buyer direct* – the buyer directs all of its sellers to submit invoices through its EIPP application. This model is suited to large buyers receiving high volumes of invoices. For example, Brittany Ferries uses this model with AxsPoint software.
- *Consolidator* – buyers and sellers allow a middleman (usually a bank) to act as an online hub, providing an interface between many buyers and sellers. A consolidator collects and aggregates invoices and can provide other financial services like factoring or payment processing. The middleman is also responsible for setting up all the functions of bill data translation, data formatting and storage, website presentation, buyer enrolment and security, buyer training and support, payment initiation and remittance processing. For example, DHL uses this model with Citibank.

For each model there are two types of provider:

- *Application vendors* like BCE Emergis or iPlanet enable companies to run EIPP from their own websites or banks to publish clients' bills on their behalf.
- *Transaction vendors* such as Billingzone and EDS act as an ASP, selling EIPP services via hosted websites.



## E-TREASURY

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### E-banking

#### Case study 5.2

##### Philips

Philips<sup>4</sup> had 600 banking partners in 1997 and an unknown number of bank accounts. Now treasury activities are centralized into one main office in Holland and three satellite centres – Asia, Latin America and the US. It has just one cash management bank per country, and through the use of an overlay bank, pools almost all its cash into various currency centres every day, such as a global euro pool in London. Hommen, the CFO, explained:

*We wanted to increase the turnover of cash in our company by reducing the amount of cash in transit. We now work with a lot less cash than we did before.*

One way it has been able to do this is by setting up a payment factory, a single hub which could handle each of the 2.5 million payments that the company makes worldwide each year. Business units (BU) still decide who, what and when to pay, but they let the hub make the payment. In 1999, Philips picked software from Alterna Technologies to run the hub and Citibank and Bank of America to act as disbursement banks.

The BU approves the payment order, its accounting software sends instruction to the payments factory, it is processed and, in the case of a third-party payment, routed through to one of the banking partners; funds are then transferred into the account of the supplier, who is automatically notified. The accounts payable ledger of the relevant Philips business is reconciled. In the case of an inter-company payment, no external transaction or fund transfer occurs; instead the payments are settled using a new in-house bank which Philips developed as part of its payment factory. Each BU has a 'virtual' account held at the group's treasury centre, which they can view with a web browser. With all the group's global cash resources pooled together, the in-house bank shows how much of that cash belongs to each division.

By handling all the group's payments centrally, international payments have been turned into cheaper domestic ones, saving Philips around €1 million every year. Hundreds of staff worldwide no longer have to concern themselves with making payments – that is now done by the payment factory, which is manned by just five people. Savings of about €5 million have materialized from the elimination of maintaining more than 400 interfaces between Philips IT systems and its banks.

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### Foreign exchange trading

Straight through processing (STP) is the complete streamlining and automation of an entire foreign-exchange trade cycle, i.e. the removal of all manual intervention.<sup>5</sup> E-forex portals have focused on streamlining the middle and back offices.

### Case study 5.3

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#### Atriax

*Atriax*, part of GE, is fully integrating its dealing engine with Fxpress, its risk management

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### Case study 5.4

system.

#### Sara Lee DE

*Sara Lee DE*, the €6 billion subsidiary of the consumer goods firm, are running a project with Currenex to improve the way internal forex trade requests are collected and managed. It plans to automate the front, middle and back offices by building an interface with the treasury management system, which will automate the settlement of trades.

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## ELECTRONIC BILL PRESENTMENT AND PAYMENT

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B2C EBPP is a different proposition to that of large company B2B EIPP systems, with estimates of 190 billion online transactions worldwide in 2000. A recent report by Logica and Capital Economics argues that it is just a matter of time before payments systems are transformed with instantaneous money transmission and settlements and continuous interest accrual in real time.<sup>6</sup> By 2010 it is predicted that with quick, cheap and secure electronic payments, physical cash will disappear.

EBPP offers a number of different payment mechanisms including:

### Debit and credit cards

This is the most popular method of payment, with two main methods for e-tailers to facilitate this form of payment, though they are not really suitable for micro payments (*see below*):

- *Electronic Funds Transfer (EFT)*. This involves the Internet merchants, i.e. people and organizations that accept cards as payment for an Internet transaction, integrating an EFT solution into their websites. This simplifies the buying process for their customers and provides added reassurance that the payment has been cleared by a financial institution that processes all card transactions on behalf of the merchant, i.e. an acquiring bank. The bank submits the transaction details to the card issuers, recovers the payment from them and reimburses the merchant, less a commission charge.
- *Payment Service Provider (PSP)*.<sup>7</sup> This offers an EFT facility to its customers through a bureau service. This is the preferred choice for start-up companies or companies processing a low volume of credit card transactions.

Concerns over fraud, for which the merchant takes the responsibility in cardholder-not-present (CNP) transactions, are being overcome by a number of additional security measures that include:

- *Smart cards* reduce fraud because, unlike their magnetic strip predecessor, the chip can decide to force an online conversation with the acquiring bank the next time it is used. Ignoring merchant floor limits the card can check to ensure it has not been stolen. This encrypted conversation ensures that the card and card reader are the people they claim to be.
- *PIN numbers* will further reduce fraud.
- A *card security code (CV2)* is included as the last three or four digits of the signature stripe and represents a unique card verification method.
- An *Address Verification Service (AVS)* has been used in the US since 1991; it is based on the cardholder's postcode.
- *3D SET (three domain secure electronic transaction)* is a software-based server-side authentication solution used by Visa and Mastercard. The cardholder's details are held in a wallet on the card-issuing institution's server, which authenticates the cardholder to the merchant and vice versa.

### Micro payments<sup>8</sup>

'Micro payments' are very small amounts of money, that are not worth the cost of paying charges relating to credit and debit cards. Early attempts to solve this problem, including digital currencies like Digicash, have now closed. New methods are now being launched to handle micro payments including the following:

- *Pre-pay cards* are similar to pre-pay phone cards. One example is Splash Plastic, where users charge their cards using cash in a shop or via standing order or cheque payment, which is then credited to the card. Merchants receive credit for transactions made 21 days later and pay a fee for the service. MicroMoney from Deutsche Telecom is a similar product. However, these are still expensive to run.
- *PayDirect* is a joint venture between the Internet portal Yahoo! and HSBC. It allows users to register their credit card or bank account details with HSBC in a PayDirect account. Money can then be transferred to buy goods from participating merchants.
- *Bertelsmann* has developed a virtual server-based solution, which could be loaded with value from an online account held by the customer.
- *Add to Telephone Bill* is due to be launched in 2002 in Europe. This method adds micro payments to the consumer's telephone bill, either fixed line or mobile, using authentication through a personal identification linked to the

user's account. Merchants would receive a corresponding monthly credit to their phone bill or bank.

### BiBit

BiBit is an Internet service provider based in the Netherlands, many of whose clients sell via a number of channels, including the Internet. BiBit handles the payment side of transactions on behalf of clients. Once the customer has agreed to make a purchase on a website, they click through to a payment screen which is run by BiBit but which can be branded to appear as the merchant's own, on which the customer has a choice of up to 50 ways to pay. All links to financial institutions are handled by BiBit. They support any payment method with a substantial user base.

### EasyBis.com<sup>9</sup>

EasyBis (Albany software) delivers a service that gives low-cost access to customers and can be used by utility companies collecting payments for variable monthly bills. By using EBPP customers can log on to secure sites to pay invoices utilizing a variety of payment methods including variable direct debit, credit/debit card or cheque, where they advise the cheque number and estimated date of receipt.

### Amazon.com<sup>10</sup>

Amazon, which has continuously evolved its online service, is to let customers use an online credit payment system as an alternative to orthodox credit and debit cards. The system will work much like a department store card, with customers being sent a monthly bill. Current methods mean that Amazon pays a fee to payment processing companies such as Arcot, which act as a hub between merchant, consumer and bank to ensure that financial transactions are carried out securely. This new scheme will save money on transaction charges and lower administration costs.

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# Statutory and risk management considerations

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## INTRODUCTION

The Turnbull Report (which came into effect early 2000) makes directors responsible for evaluating risks to IT infrastructure while the Data Protection Act 1998 makes them responsible for guarding against unauthorized access to client and employee information. The Obscene Publications Act 1959 makes them liable if their servers are used to harbour offensive material. Litigation from shareholders, suppliers and consumers could follow a breakdown in performance due to systems being corrupted and from third parties when servers are hijacked without their knowledge and used as staging posts for denial-of-service (DOS) attacks on other sites.<sup>1</sup> So it is not surprising that companies are becoming attuned to the idea that infrastructure security is an essential cost of doing business. This combined with the general move to web-enabled business communities necessitates more stringent Internet and network infrastructure security, with companies allocating 10–15 per cent of IT budgets to information security, depending on their corporate risk profile.

There is a need for a sound, dynamic security policy which is embedded in the corporate culture, combined with an ongoing risk assessment and mitigation process, including business continuity in addition to the more obvious physical and technical tools such as firewalls. There is a growing trend to outsource many aspects of corporate security management to specialists. The challenge is to achieve maximum functionality within an entirely secure environment by including security in the design. For example, DuPont, working with their outsourcer CSC, has achieved this end and finds that customers and staff can move seamlessly around their system without realizing they are traversing layer upon layer of security.

An Information Security Breaches Survey carried out in 2000 by the DTI indicated that 43 per cent of organizations with critical or sensitive information suffered serious breaches of information security.<sup>2</sup> They estimate that the cost to business in the UK, if this same rate continues, could be in the region of £12 billion per annum by 2002.

## DYNAMIC SECURITY POLICY

### Ongoing risk assessment

Ongoing risk management requires a comprehensive approach to network security. It is necessary to analyse entire infrastructures – firewalls, routers, applications, operating systems, WLANs, web applications and databases – for weak spots and to mitigate all threats. It is often found that a successful attack takes advantage of a service or function inside the server that is never or only rarely used.

### **Case study 6.1**

#### **PacifiCare Health Systems**

*PacifiCare Health Systems*<sup>3</sup> takes every component of the enterprise into account from a risk perspective and then defines and prioritizes risk mitigation for each component. The company has a computer incident response team, an internal group whose charter is to determine how serious a network breach is and how to respond.

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## Disaster recovery

Disaster recovery must be included in any security strategy, with anti-terrorism featuring higher in most organizations concerns than ever before. This must incorporate the impact on the whole business, not just IT, and is termed business continuity. Money invested here can be saved on insurance premiums.

### **Case study 6.2**

#### **Synstar and SchlumbergerSema**

*Synstar and SchlumbergerSema*<sup>4</sup> in the UK operate off-site recovery centres for businesses. At SchlumbergerSema's business recovery centre in Docklands district, the services fall into three categories – hot, warm and cold. Hot provides a live, parallel-running capability; warm offers regular back-up and a ready-to-run capability; and cold takes care of long-term support based on the offline availability of backed-up data. In addition to a number of rented office units, services offered include advisory, security, network and data management.

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### **Case study 6.3**

#### **Sainsbury**

*Sainsbury's*, which has had a business continuity manager since 1996, now has a comprehensive strategy covering all its 480 stores and which it has now extended out to its supply chain.

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## A dynamic IT corporate policy

This document will help staff in security procedures and product use as part of the integrated enterprise risk management strategy. Such a policy needs to cover not only pornography, defamation, harassment, unauthorized access, breach of copyright, confidential information, impact on productivity, the right to intercept



communications and personal e-mail, but also what devices employees can connect to the network and how much downloaded company data constitutes theft. It is necessary for the user community to understand what the company is trying to achieve with its security policy because individual users are capable of compromising or bypassing most security measures. Equally important are well-trained and motivated security staff.

### E-mail management policy

This is a policy that defines for the employee what is appropriate and what is inappropriate and outlines some etiquette for e-mail use. Such a policy will establish a culture of economical use of e-mail and reduce the risk of legal liability. It will help to define the line between employee privacy and the enterprise's responsibility to its investors to keep systems running efficiently and to prevent embarrassment or consequences to the enterprise that can stem from inappropriate actions on the part of the employees. With virus attacks rising exponentially e-mail users have lost their naivety about security. According to Gartner, the amount of spam in the networks today is about 16 times what it was two years ago.<sup>5</sup> It estimates 30–50 per cent of messages coming toward enterprises are spam or involve malicious content. Serious spam control is needed to optimize the use of bandwidth, disk space and people time. Concerns about terrorism and industrial espionage are also very real.

### E-commerce insurance

Insurance is a good idea to complement any security policy and it comes in many options that need to be investigated to ascertain the correct coverage including the following:

- *Third-party coverage:*
  - errors and omissions or professional liability;
  - Internet liability (additional coverage for losses and lawsuits);
  - contractual obligation coverage for those companies delivering over the Web;
  - directors and officers.
- *First-party coverage:*
  - ransom for data extortion;
  - public relations;
  - business interruption for a digital disaster.

## PHYSICAL AND TECHNICAL SECURITY TOOLS

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### Intranets and extranets

Intranets and extranets make use of a channel that is not available to the public, like a VAN (value-added network) or VPN (virtual private network). VPNs offer a viable alternative to expensive leased-line private networks. It sets up an encrypted secure link over the highly unsecure, public highway of the Internet. It needs to be noted that VPNs still pass across web servers that are not under the control of the sender and that it is the encryption or protocol that will secure the data.

### Firewal ls

These are dedicated hardware and software systems designed to block access to the internal IT environment by screening information flow between networks. Intelligent products, like Sanctum, guard against attempts to make unauthorized changes to web pages. Many firms are hiring outside security firms to test their firewall security. Called ethical hacking, the process helps pinpoint weaknesses in networks and gauge response time to an attack.

### Public key infrastructure (PKI)

This provides strong authentication and non-repudiation of transactions, including encryption keys, digital signatures and certification authorities. The Web relies largely on Secure Socket Layer (SSL) encryption technology to protect innumerable transactions for e-business and it is necessary for developers to fully understand the requirements. Oracle's Virtual Private Database, for example, pushes user authentication all the way down to individual rows in a database table. Unbreakable security is about reducing downtime.

### Anti-virus product

Anti-virus protection is part of content management and requires frequent and largely automatic updates.

#### **Case study 6.4**

##### **Deutsche Bank**

*Deutsche Bank*, which has 90,000 employees with desktops worldwide, chose Norton AntiVirus from Symantec.

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## Intrusion detection devices

Intrusion detection devices are designed to combat hackers. They sit behind the firewall and look for malevolent activity inside the corporate network. Yahoo!, Amazon and Microsoft are all examples of companies which have suffered publicly at the hands of hackers who caused their servers to crash. Other victims include Powergen, Woolworths and Barclays, where customer credit card details have been revealed, and even NASA have admitted that the safety of shuttle astronauts had been compromised by hackers.

## INDUSTRY STANDARDS

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### Internet security

Keith Foggon, in his book *Internet Security*, says:

*Computer audit no longer concerns only checking of password controls, violation logs and anti-virus measures; auditors now need an understanding of all network and system vulnerabilities, their weaknesses and how these will be exploited.<sup>6</sup>*

### BS 7799 or IS 17799

This is a set of security standards formed by a group of European multinationals, including Shell. Its aim is to improve e-commerce security through common practices to deal with hacking, accident, sabotage, unauthorized disclosure and IT systems failure. Part one of the standard provides a code of practice that helps organizations to tackle IT risk management at an appropriate level and requires the formation of a security forum that involves senior management.

### [Microsoft.Net](#) My Services

The initial focus of this product was as a user-centric, single sign-on mechanism, linking Passport to Windows Active Directory consisting of services like My Wallet, My Location, My Profile, with the Passport user ID as the unique identifier. Microsoft intend to open it up so that it can be allocated to groups and even small businesses, evolving into an authentication system with its own set of management tools. Microsoft's Passport V3, which will support the Kerberos encryption

standard, enables any service provider to create their own single sign-on mechanism and, as a top-level security provider, interact with Passport to allow users to use any validated credentials to access websites. By using a third-party mechanism, such as SAS 70, and having a clear standards and certification process, businesses can handle both consumer and business partner access to their systems.

## STATUTORY CONSIDERATIONS

### The Regulation of Investigatory Powers (RIP) Act 2000: e-mail and telephone monitoring

This Act gives new powers to protect the public in areas such as surveillance of websites. It provides a clear framework for the lawful interception of postal systems, telecommunications and digital communications. Company practices, policies and online codes should be revised to reflect the Act. The RIP Act does not give a blanket licence to employers or their staff to monitor and record communications covertly or otherwise. It intersects with the Data Protection Act 1998 and the Human Rights Act 1998 against which any action under the RIP Act must be balanced.

### The Data Protection Act 1998

This will have a significant effect on the use of certain Internet information systems, including the provision of material via the Web.

- Informed consent needs to be gained before personal data related to readily identifiable individuals is used on the Web.
- When organizations use Web pages to collect personal data, such as names and addresses of individuals who request documentation, the following information should be provided at the point of collection:
  - the purpose for which the data is collected;
  - the recipients to whom data may be disclosed;
  - the period for which the data will be kept.

### Online Personal Privacy Act

In the US this Act requires companies to treat sensitive and non-sensitive personally identifiable information separately. For organizations wishing to establish a privacy policy, the Disney website is often quoted as having an exemplary privacy

notice. Guidelines are available from the Online Privacy Alliance (OPA) at [www.privacyalliance.org](http://www.privacyalliance.org) and the Direct Marketing Association's website [www.the-dma.org](http://www.the-dma.org).

## Defamation Act 1996

This Act provides that once ISPs are apprised of third-party defamatory content on their servers, they must take all reasonable steps to remove or deny access to it. Cybersmearing is used to blacken the good name of a company or its product. Although most lack the drama and magnitude of a DOS attack the repercussions of some of these assaults can be devastating, e.g. spreading rumours through Internet news groups and discussion forums that a fast food chain is serving tainted food, which in turn could lead to a fall-off in sales. Often the disaffected set up an attack website devoted to bashing the company, e.g. McDonald's. Courts are generally finding in favour of the smeared in these cases using the principle that 'there are no rights to free speech to defame'.

## Copyright law and intellectual property rights (IPR)

This legislation addresses infringement, largely as a result of sustained pressure from major copyright holders who are concerned to ensure that their interests are not undermined by digital copying. This law has two main threads:

- ISPs will be granted a limited immunity from liability for copyright infringement, providing they are unaware that it is on their server, do not receive financial benefit and respond quickly to remove the material.
- Copyright holders will be granted greater powers over digital copying of their works.

Several recent legal cases have meant that companies can also be liable for material held on websites to which they have a link. Linking should be undertaken with caution.

## Obscene Publications Act 1959

This Act, as amended by the Criminal Justice and Public Order Act 1994, states that if an article is obscene, it is an offence to publish it. The Obscene Publications Act 1964 makes it an offence to have an obscene article in ownership, possession or control, which includes obscene material placed on a web server for transfer or downloading electronically.

## Computer Misuse Act 1990

This makes unauthorized hacking an offence even if there is no intention to cause harm. This only covers unauthorized access to a computer or data held on it and not mere access by authorized users of computer and data for unauthorized purposes. The Act also catches, under its conspiracy to commit an offence provisions, the publishing of material that might be used to breach computer security or facilitate unauthorized entry into computer systems, e.g. a virus.

A 'Denial of service' (DOS) attack is an attempt by attackers to prevent legitimate users of a service from using that service. Examples include:

- attempts to flood a network, preventing legitimate traffic – high-profile cases include Amazon, Ebay and Barclays;
- attempts to disrupt connections between two machines, preventing access;
- attempts to prevent an individual from accessing;
- attempts to disrupt service to a person or system.

A *distributed DOS attack* is where a hacker may obtain access to large numbers of computers, often using 'Trojan Horse' software, and install software servers designed to engage in a particular form of DOS attack. The hacker can then message all the servers and instruct them to send traffic to a target computer. *Trojan Horse* software is a piece of code that hides inside another program and performs a concealed function. Uses include hiding or installing viruses or DOS software, e.g. Netbus and Back Orifice. The use of Trojan Horse software clearly falls under the Act, but an attack itself may not.

The provision of adequate security measures by organizations to prevent such attacks may lead to liability under the Data Protection Act 1998 if personal data is erased, altered or stolen by a hacker. Equally, companies might find themselves being sued if their systems are poorly configured or protected and are taken over by a hacker in a distributed DOS attack against a third party.

## Rome II<sup>7</sup>

Rome II is a green paper scheduled for adoption by the European Commission in 2001. It covers non-contractual liability, such as product liability, defamation and unfair competitive practices, and is aimed at smoothing commerce across the many borders of the EC. Under this paper, the applicable law to non-contractual liability will be the law of the place where the act has its effect, e.g. if a US-based website can be accessed in Germany, then the e-tailer would be subject to the non-contractual liability laws of Germany. This follows common standards set by the EC in 2000 on jurisdiction and enforcement of judgments in civil and commercial matters. The

regulation states that consumers can sue an e-tailer in their home countries, not where the e-tailer is based.

### Convention on Cybercrime 2001<sup>8</sup>

This commits participating countries to define certain activities as cybercrimes and ensure that they have authority to take investigative and enforcement measures within their borders, putting themselves at the service of other signatories. This can lead to problems where laws apply in one country and not in another. For example, a French court ordered Yahoo! to find a way of preventing web surfers in France from viewing Nazi memorabilia, which is illegal in France. Yahoo! dealt with it by banning Nazi memorabilia entirely.

### Taxation on electronic commerce

The EU has agreed that from July 2003 non-EU suppliers of digital goods, e.g. music, computer services and software, which are provided or can be downloaded over the Internet must charge VAT to their European consumers.<sup>9</sup> The rules apply to private consumers for an initial three-year period. The aim is to provide a level playing field for EU businesses. For example, according to Freeserve, AOL saves itself £40 million a year as a result of not charging VAT. The enforcement of the rules is by the requirement of affected non-EU businesses to register in a member state of their choice, but levy VAT at the rate of the consumer's resident country.

In the US the Internet Tax Freedom Act 1998 placed a three-year moratorium on taxing Net access charges.<sup>10</sup> The legislation clamped a similar muzzle on any attempt to subject e-consumers to taxation in multiple states on the same transaction, and on discriminating taxation. The Act also set up an Advisory Commission on Electronic Commerce to look at cybertaxes, which has advised that Congress extend the current ban on discriminatory taxes and eliminate Net access taxes altogether.





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## End-to-End Business Processes

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# Enterprise resource planning

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## INTRODUCTION

Enterprise resource planning (ERP) is something of a misnomer as it has nothing to do with either planning or resources but it is to do with enterprise. It attempts to integrate all functions and departments across the enterprise onto one single computer system. ERP is software architecture that allows the exchange of information between all functions, e.g. manufacturing, finance, procurement and human resources, and manages them as processes not functions. It is based on client/server technology, where the client (the PC on a user's desk) handles tasks such as displaying information, checking validity of data input and formatting reports and the server (another computer, usually a mainframe or mid-range) is dedicated to storing information and serving the information required to the client.

In the late 1990s, ERP became the accepted solution for larger organizations, as they sought to gain corporate advantage from the automation and integration of the separate parts of their businesses as well as solving their Y2K problems. Installing ERP is fundamentally about business change, re-engineering and automatically linking activities across the organization to form E2E processes, changing working practices and delivering information electronically across the organization. The impact of these technological developments on the organization is profound. The new systems are changing not only the method of operation by adding a few new features and some extra functionality but the whole structure of the traditional organization.

The major suppliers of ERP systems include SAP, Oracle, BAAN and Peoplesoft in the large-company marketplace down to Sage in the SMEs and dozens in between including JD Edwards and Scala.

## ERP HAS FACILITATED PROCESS MANAGEMENT

The use of ERP or integrated software has facilitated management by process, e.g. the procurement process, from order to payment, in a fully automated way requiring little or no manual intervention. Utilizing workflow systems, which electronically route orders through the process with payments made by electronic transfer and document-management technology enables access to all data electronically from any location.

Another process example would be the order fulfilment process, which involves the activities of taking an order, delivering, invoicing and collecting the funds. With ERP, when an order is taken from a customer, all the information necessary to complete the order (from credit rating, order history, stock levels and delivery schedules) is available to the customer service operator at the touch of a button on the desktop computer, with the added ability to drill down to any document needed to complete

the transaction. The same information is viewed by everyone in the organization because it is held on one single database. The order is routed automatically around the departments to completion – with anyone in the company able to see where it is at any given point in time. Everyone in all departments involved – finance, sales, warehouse and transport – are obliged to have done their jobs to ensure the correct information is available for the customer order to be taken. The old departmental culture of not being responsible for what goes on outside your department is no longer applicable under ERP. Everyone must be concerned with the whole enterprise and accountability, responsibility and communication are the keys to this new culture. It has resulted in departmental boundaries being broken down so that the twenty-first century organization structure looks very different, with back-office functions often incorporated into an SSC (*see p. 8*).

## DRIVERS FOR IMPLEMENTING ERP

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- Integrate data to one single enterprise database, ensuring just one version of the truth.
- Standardize systems and processes across the whole organization.
- Optimize the processes.
- Save time.
- Reduce costs.
- Increase productivity.
- Reduce headcount.
- Improve profitability.
- Improve competitiveness.
- Facilitate a culture change within the organization.
- Improve communications throughout the business.
- Improve the customer relationship by providing a more efficient and effective service.
- Improve relationships with suppliers and other partners.
- Enable e-business and e-commerce.

## ADVANTAGES OF ERP

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- Integrated common database management system, giving obvious advantages for maintenance and end-user training.
- Reduction of redundant data.

- ERP application software has advantages over bespoke software in that it is able to take advantage of upgrades and a large user base.
- Increased efficiency through the ability to drill down to source transactions.
- Facilitation of OLAP and data warehousing.
- Ability to handle multi-currency requirements.
- Facilitates E2E process management.
- Facilitates business process re-engineering (BPR).

## PROBLEMS ENCOUNTERED WITH ERP

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- Implementations can sometimes be very time consuming, often measured in years.
- Implementations can be expensive, with estimates of costs varying from three to ten times software price, depending on vendor.
- Estimate overruns are known to occur.
- There may be a failure to re-engineer processes prior to implementation.
- The complexity of such systems can require considerable amounts of consultancy.
- Tweaking and tuning of the standard package can prove expensive.
  - Scope creep may occur, with companies adding functionality during implementation.
  - Ongoing requirement for support and services. Failure to manage expectations of what it can deliver.
  - Under-resourcing the implementation.
  - High levels of user training required.
  -

## ERP IN THE TWENTY-FIRST CENTURY

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In the twenty-first century users still want the cross-sector functionality of ERP, but they also want deeper industry-specific and highly integrated front-office capabilities like CRM and equally important web integration and business intelligence tools. Peter Koerting of Deloitte Consulting says:

*A lot of clients would like to jump on the e-train but find that their ERP legacy systems are not in the shape necessary to sell a product over the Web or do a pan-European supply chain initiative. For example, there are quite a number of companies out there that say to the market, yes, we are are fully on*

Continued

*SAP, but when you look behind the scenes they have 20 different SAP instances, incompatible with each other. Different material numbering systems mean that a product number can differ in the UK and Germany. If this is the case how can you set up a website and sell your products over the Internet?<sup>1</sup>*

ERP vendors recognize that they need to offer flexibility and agility and have redesigned their products into easily integrated components that allow the use of other components as well. The strength of global ERP products is that they are needed to provide a firm foundation on which to build on other products to achieve the desired BCI:

- *Oracle 9i* has been aimed at the management of e-business and B2B processes. The database becomes the centre of an integrated suite of applications currently available from multiple vendors, with a focus on OLAP, data mining and data warehousing.
- *Peoplesoft* has added CRM, SCM, human resource and financial planning and budgeting analytical applications to its Enterprise Performance Management suite.
- *SAP*, which earns 60 per cent of its income from [mySAP.com](http://mySAP.com), its e-business software, has entered into a joint Internet portal venture with Yahoo!
- *Scala's* André Israel explained when launching their Net-enabled version i2.1 in May 2002:

*Over the last two years we have been more focused than ever before. We have concluded a lot of people cannot handle the complexity. We have gone away and designed an offering, which comprises less complexity in the core product and more connectivity.*

- *JD Edwards* calls its post-ERP solution *collaborative commerce*.

## Benefits of latest generation of Internet-enabled ERP applications

- They are easier to use, making roll-outs much simpler.
- They are available on a rented basis through ASPs and operate on thin client PCs (a computer that is cheap and easy to run because all the data processing is done on central servers) and a web browser.
- Future developments can be more quickly designed and rolled out.
- They are broken down into three main parts:



- the enterprise applications aimed at employees;
  - supplier applications;
  - customer applications.
- Each category is then broken down into:
- backbone functions – the back office;
  - collaborative applications, which will encompass all users.

The case study from Royal National Lifeboat Institution (RNLI) (*see* p. 80) illustrates how an entire ERP suite can be installed successfully in nine months and within budget.

## SERVICE PROCESS OPTIMIZATION

Service process optimization (SPO) has grown out of the need for services-based organizations, both internal and external, to fully exploit their capacity to change and evolve in today's dynamic business environment. They have more natural flexibility than manufacturing or supply chain operations and this leads to a very different set of systems requirements and approach to systems development. First, there is the need to continually assess the performance of all parts of the organization, followed by the requirement to rapidly implement business changes as informed by changing information, and finally the wish to automate and reduce the costs of internal business processes to facilitate value-adding activity.

SPO software is designed to track and allocate the major resources of service companies or departments, i.e. people, intellectual capital and time traced to their outputs, such as proposals, contracts, projects and reports. SPO is also known as professional services automation (PSA), enterprise service automation (ESA) and services relationship management (SRM). Gartner Dataquest predict with a 0.7 probability that by 2005 80 per cent of all IT professional organizations with over 100 billable consultants will replace their project management applications with SPO.<sup>2</sup> Large users include KPMG, Ericsson, NCR and CSC, with the largest providers including Peoplesoft, Oracle, SAP and Aggresso.

### Case study 7.1

#### Aggresso

*Aggresso*, a leading provider of enterprise solutions serving service-based organizations in Europe, has worked hard to distinguish between ERP systems – which the company sees as 'control' systems for relatively static operations – and SPO.<sup>3</sup> SPO needs a degree of 'control' for core operational processes, but must also fuel and facilitate rapid change. Aggresso offers E2E SPO solutions enabling information to move freely and efficiently from consultants, clients and other partners throughout the organization, providing executives with a complete picture of their organization. It is seen as a people-centric solution, with the

ability to rapidly manage change as the needs of the business change. The focus is on information dissemination, not just process automation.

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## Service processes

SPO integrates into one solution the main processes that take place in service organizations. These include:

- *Opportunity management* which includes qualifying projects and clients, tracking sales opportunities, forecasting revenues and consolidating opportunities into a project. Existing solutions include CRM and the sales team.
- *Proposal creation* which requires accessing old projects, developing proposals, pricing and delivery timetabling. Existing solutions include knowledge management systems and MS Office or similar tools.
- *Resource scheduling* where resources are assigned depending on variable factors including skills, experience, availability, location, internal and external. Tools commonly used include MS Office, specialist HR scheduling software, preferred suppliers for external resources.
- *Project management* where project plans are drawn up, with milestones and priorities, which are tracked and reported on and if necessary modified. Tools commonly used include Project Management software like MS Project.
- *Time and expense capture, accounting and reporting.* This information needs to be integrated into back-office systems such as invoicing and payments and incorporated in project costing and management activities. Traditionally such processes were managed by time-sheeting, data capture systems and project accounting.
- *Reporting* operational reports, resource utilization, customer profitability, organizational profitability, scenario planning. Traditional solutions include spreadsheets or home designed tools.

The software can incorporate the following modules, features and functionality:

- opportunity management;
- resource management;
- human resources;
- project management;
- time and expense capture;
- project costing and billing;
- logistics;
- project accounting;

- financials;
- knowledge management, including document sharing and storage;
- strategic sourcing, which recognizes the need to use external resources as a growing trend;
- portfolio management and analytical processing, providing online information, virtual invoices and dashboards, for example.

## Benefits of SPO

- better portfolio management;
- quicker, more informed decision making;
- improved project management;
- improved data integrity;
- shorter delivery time;
- cost savings and improved profitability in process;
- greater customer satisfaction;
- improved use of resources;
- better strategic sourcing;
- facilitates change management;
- necessary to maintain competitive advantage against other (external) suppliers;
- measurable operations that can be benchmarked;
- end-to-end process management.

Gartner research into portfolio management within internal IT departments revealed that out of 60 enterprises surveyed 37 per cent gathered their information manually and a further 27 per cent do not carry out this vital management activity at all.<sup>4</sup> Similarly, the same survey revealed that 43 per cent have no process for tracking the utilization of their employees.

## ELECTRONIC DOCUMENT MANAGEMENT

The removal of paper and manual intervention from processes is an essential part of automation from E2E.

### Document management

Document management is a standardized approach to the indexing and management of documents entering the company in whatever form, e.g. paper, computer systems,

Internet, microfiche, fax and e-mail, utilizing such techniques as document imaging. Having compiled a comprehensive database of information, it can be queried at will via the desktop, saving considerable time and space and providing a necessary backup for paper records. The approach has now moved beyond early document management systems, the role of which was seen as to capture everything that entered the company. The aim now is to challenge the amount of documentation being received and consider how and if it needs to be stored electronically.

## Workflow

Workflow systems can be designed to deliver specified data periodically to selected people. They can remove the need for paper, automatically route electronic documents and enforce procedures written into a process, used widely for ERP and E2E, e.g. purchase order-processing systems.

### **Case study 7.2**

#### Steinbeis Temming

*Steinbeis Temming* use SERware's intelligent workflow product, to capture, classify and analyse data on incoming invoices before workflowing them through to its back-end SAP system. The time taken to populate the ERP system was reduced from half a day to minutes with significant accuracy improvements. While an average person can read 200 pages a day, the SERware can process twice that amount in minutes.

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## Computer and telephone integration

The use of computer and telephone integration (CTI) technology has revolutionized systems, with telephones linked directly into ERP and other computer software and voicemail products, e.g. routing consumer calls into the right part of the company customer services by means of customers pressing numbers on their digital telephone.

### **Case study 7.3**

#### RNLI

##### *Background*

The Royal National Lifeboat Institution<sup>5</sup> is a registered charity dedicated to saving lives at sea. It provides, on call, the 24-hour service necessary to cover search and rescue requirements up to a distance of 50 miles from the coast of the United Kingdom and the Republic of Ireland. The RNLI has its headquarters at Poole, a production facility on the Isle of Wight, six divisional bases supporting 224 lifeboat stations and ten regional fundraising offices. The charity takes responsibility for the design, build and maintenance of its lifeboats, launching equipment and stations and all crew training is undertaken in-house by the RNLI. The RNLI

employs 900 full-time staff and 4,500 volunteer crew to carry out this vital work. Its income in 2000 was £100 million.

#### *ERP decision*

In August 1998 a decision was made to purchase ERP software as core systems support for the RNLI on account of the fact that the existing:

- software would not in some cases be supported beyond 2000;
- systems were disparate and many were manual (handwritten books and card files);
- software and technology were outdated.

In addition it was recognized that the existing information systems were not robust enough to satisfy the increasing requirements of managers and trustees.

An ERP solution was recommended by a project team, which comprised representatives from finance, technical, operations, purchasing and IT, and which originally tasked to replace the financial, purchasing, stores and production software. Following the agreement for an enterprise-wide solution the team reviewed the options and selected SAP. At that time the personnel department was looking to replace two in-house HR packages and the RNLI was about to move to a UNIX database and update its legacy systems accordingly.

#### *Flagship project implementation*

A contract was signed with SAP in August 1999 and a team was formed with the name of 'Flagship' to implement seven SAP R3 modules and to write two bespoke programs interfacing with R3 to support the unique features of the lifeboat service. Significant business areas included were finance, materials management, warehouse management, new construction of lifeboats, plant maintenance, production planning and personnel administration (including staff and volunteers). The bespoke software was for rescue records and an incident database for the RNLI and third-party sea rescue organizations. Following the implementation, most of the RNLI's back-office systems are now supported by SAP.

The kick-off meeting was on 1 September 1999 and the implementation was successfully completed on 5 June 2000 on time and under budget. The 'go live' was in two phases with the financials and some purchasing on 3 April with the remaining modules on 5 June. Some further core consultancy was affordable within the budget to assist users while the software bedded down and was retained for three months post-implementation.

#### *Project boundaries defined*

The project team was tasked as a priority to meet the deadlines, and second, to keep within budget and implement core functionality. Frills and 'nice to haves' were to be addressed at a later date. It was also agreed that 'vanilla' SAP would be implemented, i.e. with as little customization as possible, while consistent and best business practice was to be introduced to the operations of the RNLI with minimum disruption to the business. This was felt to be the strongest base from which to implement a fully integrated suite of software. While appreciating the complexities involved the motto was KIS (keep it simple).

The project owes much of its success to this clear statement of boundaries. The fact that they were adhered to during the implementation prevented the project from being diverted. Concentration centred on mastering the basics in the belief that this would help the avoidance of fatal flaws and sidetracking.

### *BPR*

There was no business process re-engineering prior to the implementation and little by way of formal, documented business procedures. Although this increased the time pressure on the teams any re-engineering was carried out and documentation produced as part of the project. At all times the team members were committed to producing the best solution for the RNLI.

Following the implementation the package has been enhanced so that payrolls may be produced in-house and competence-based training records may be held for volunteer crews.

### *Tips on successful implementation*

ERP solutions are best implemented quickly to maintain momentum and need to meet agreed timescales to preserve credibility. Key to success is the selection of an able, committed and determined project manager with good knowledge of and support from within the organization and from the software supplier. The inclusion of senior managers within the team is also critical to a successful implementation. These are the people who should have the greatest knowledge of business areas and the strategic vision to manage integration issues. Where modules are configured and installed concurrently integration issues can be addressed and resolved within the original implementation and are unlikely to require substantial change at a later date. Any scope increases need to be monitored closely but, where possible, avoided. Communication with management and the user population needs to be regular, clear and timely to ensure that they are fully aware of the project's progress and prepared for the impact that will be felt across the organization when the system is switched on. Change management and training are fundamental to postimplementation acceptance of the software and new systems and require special attention and dedicated resources for the duration of the project.

### *Problems encountered*

Flagship was not without its share of problems. The materials management module was almost wholly configured and implemented without a champion from the business since he left and was not replaced during the course of the project. But the real Achilles heel was the inadequate resources for training and change management, most of which was undertaken by the team members and resulted in key consulting staff being retained for three months post project implementation. The impact of this resource shortfall was felt quite keenly by some of the user community who remained unforgiving for many months.

### *Conclusion*

The defining feature about Flagship was the superb relationship that existed between the two project managers (RNLI and SAP) which was at all times honest, open, loyal and supportive, first, to each other and then to the project. Without this strong affinity it is doubtful whether the project would have survived its first milestone.

Now, some 15 months on, the RNLI has a tightly integrated enterprise-wide information system that provides a solid foundation on which to build and is well positioned to exploit new IT opportunities as they arise in furtherance of the charity's objective to save lives at sea.

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## HUMAN RESOURCE MANAGEMENT

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### Self-service

Just as companies are recognizing the benefits of selling directly to consumers over the Web some companies are now applying disintermediation to their own corporate structures. An increasing number of companies are seeing the benefits of employing a self-service approach to HR, i.e. relying on corporate intranets and web-enabled software to deliver documents, benefits information and company data directly to workers. *Boston Scientific* is one convert and Nick Messerschmidt, VP of HR, says:

*My goal for HR is to take the manual transactions out of our hands and let managers do it themselves. You don't want managers spending three days running around looking for numbers.<sup>1</sup>*

### Research

Statistics from the Hunter Group show that cost savings from 50 per cent on a benefit enquiry to 88 per cent on a change of address can be gained from switching from manual to self-service, primarily from time savings in processes.<sup>2</sup> Hunter Group research shows that typical self-service HR initiatives pay for themselves in about 18 months. Traditionally, the average firm employs one HR worker to every 100 employees. Browser-based systems should improve the ratio dramatically by either increasing the productivity of existing workers or reducing overall headcount. Equally importantly, employees seem to prefer self-service HR. With virtual HR, workers can access real-time benefits information, medical forms and pay slips, all from their PCs.

IDC is predicting that the European HR services market will continue to flourish. The research firm points to a growing number of European companies seeking help from IT and consulting firms to manage HR processes such as recruiting, staffing, payroll, training and development. IDC's Mike Friend says:

*Complexities of the European market are likely to lead to the evolution of new HR outsourcing models. For many multinationals, the administration costs of a pan-European HR policy, with all the complexities of country and EU reporting regulations, has made the HR outsourcing message a compelling one. The emergence of the outsourcing model has had a knock-on effect on the broader HR services market with technology, in particular the web-enabling of HR processes, forming a key component of HR service provider offerings.<sup>3</sup>*

## System capabilities

Collaborative applications could include:

- e-benefits
- e-compensation
- e-development
- e-pay
- e-profile
- e-recruit.

Enterprise applications could include:

- human resources
- benefits administration
- pension administration
- payroll
- time recording and expenses.

Recruitment and development include:

- workforce recruitment
- competency management
- training administration
- career planning
- succession planning.

Information provided can assist with:

- position management
- health and safety
- global assignments
- employee relations management
- absence management
- company car and property tracking
- base benefits
- workforce administration and records management
- regulatory reporting.

**Case study 8.1**

## STI Knowledge

STI Knowledge,<sup>4</sup> a help-desk and call-centre outsourcer, has outsourced its HR needs to Employease and pays on a per employee, per month basis for a range of web-based services that address benefits, payroll and other issues. According to the COO the company's annual outlay of around €36,000 has produced savings of 15 times that amount.

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**Case study 8.2**

## Lafarge Group

Lafarge Group, the French construction materials manufacturer, is using Cyborg system Authoria and other products to make a new HR service centre more efficient and to allow employees to serve themselves. This frees HR staff to contribute in more substantive ways. For example, the old decentralized system required nine days simply to tabulate the number of employees the company has.

**Case study 8.3**

## National Health Service

The National Health Service (NHS) is a good example of this trend, awarding in 2001 the contract for its HR/Payroll Shared Services to a consortium which includes Oracle software.

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**Case study 8.4**

## BP Amoco

BP Amoco announced a \$600 million contract in the same year that will effectively hand over the bulk of the company's HR function to Exult. While Exult will add 100–200 workers to handle the job, BP Amoco is likely to cut its 550-man HR department by 40 per cent.

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**E-RECRUITMENT<sup>5</sup>**

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With the economy on the downturn traffic at nearly all the top job sites has almost doubled in 2001. Increasingly, corporations are going online to fill management-level positions. The benefits of online job searches are pretty obvious. The Net enables employers to trawl through an enormous pool of talent much more quickly with exponentially more prospects than traditional headhunters can contact. And because hirers can put jobs up on specialized boards, it is more likely that postings

will be seen by qualified and interested candidates. The other major benefit is that it

#### Case study 8.5

is  
considerabl  
y cheaper than going through a placement firm.

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#### Case study 8.6

##### Motorola

*Motorola's* Jim Pappas, manager of executive search, explained that every time they use a virtual job board, it saves them at least \$60,000.

##### Safeway

*Safeway*,<sup>6</sup> which has 91,000 employees in the UK, is to manage its whole recruitment process online using Peoplesoft 8 eRecruit package. After research into how the HR function, managers and employees spent their time and following scrutiny of the recruitment process, Safeway decided that a move to online processes would make recruitment more efficient and effective. Traditionally, each store handled its own recruitment but under the new system, all recruitment is handled electronically from a single centre in Warrington, to bring about standardization and consistency and free up in-store staff for more strategic activities. Open from 8 am to 8 pm, the centre has a freephone number to handle store and applicant enquiries. Applications and vacancies are handled by the web-based system. By March 2002 it was handling over 9,000 applications. Peoplesoft's HRMS is live in 100 of their 500 stores and other applications, such as employee self-service, are set to follow.

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## E-LEARNING

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Corporate use of the Internet to deliver training via virtual instructors makes sense. Distance learning cuts the costs of both delivering and attending training, but it lacks human interaction and is being used by companies to supplement rather than completely replace traditional learning.

#### Case study 8.7

##### IBM

*IBM*,<sup>7</sup> which spends €1 billion annually on employee training, has developed a four-tier strategy for employee education that forms the basis of a 12-month manager training programme called BasicBlue, which covers five times as much material as the old five-day workshop at one-third of the cost:

- *Information* covers the sharing of knowledge distributed over the Net, e.g. best practices.
- *Understanding* involves using the Web to see if employees have mastered the concepts in tier one. It is highly interactive putting staff in real-life scenarios that have been simulated on the Web.

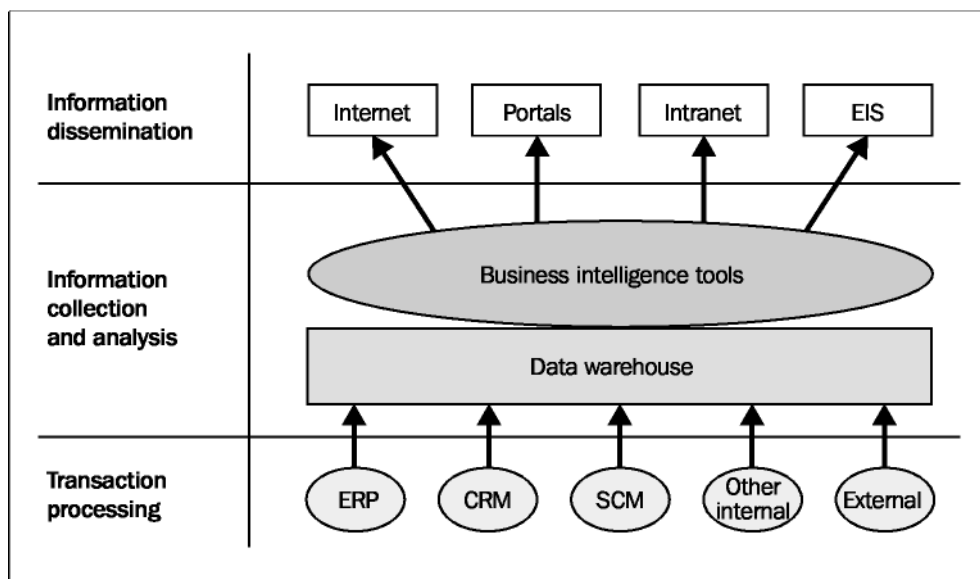
- *Collaborative learning*, which is intended to facilitate learning from peers or experts via online virtual classrooms, is produced using Lotus software.
- *Face-to-face learning*, a traditional format, is designed to allow IBM managers to polish higher-order skills and proficiencies.

## INFORMATION MANAGEMENT DELIVERING BUSINESS INTELLIGENCE

Traditionally, companies have had scores of independent IT systems, often dependent on, and driven by, individual functions and built up over decades. The 1990s became the decade when companies came to realize the importance of breaking down their functional boundaries and viewing their organizations through streamlined processes. With this realization, there is not just an appreciation of the need for a process-oriented, enterprise-wide decision-support system, but an urgent demand for its implementation, to enable companies to maintain their competitive advantage.

Figure 8.1 shows how a modern IT environment would cope with transaction processing and then pass it to a data warehouse, on top of which sit business intelligence tools, which in turn analyse the data and disseminate the information electronically via such tools as EIS, portals, the Internet, intranets and extranets. This is an extract from *Transforming the Finance Function*,<sup>8</sup> which covers definition of the business requirement, technological developments, formulating a companywide information strategy, knowledge management and decision support, and business intelligence tools, including data warehousing, OLAP, process-based DSS, portals (also covered below, pp 91–5) and website and CRM analytics (also covered on p. 142).

**Fig. 8.1** Web-enabled information management process



### Case study 8.8

#### Wal-Mart

Wal-Mart<sup>9</sup> has 4,457 stores, 30,000 suppliers and an annual turnover of \$217 billion – and one information system (IS). According to CIO Kevin Turner, running centralized IS with home-grown, common-source code gives Wal-Mart a competitive advantage and helps maintain one of the lowest expense structures in retailing. The company's philosophy is not about being the biggest but about being the best company in the world and having something called the 'divine discontent', which says that you will never be satisfied and that you can always improve. Striving for excellence is one of Wal-Mart's three core beliefs, the other two are 'having respect for the individual' and 'practising excellent customer service'.

The three principles of the IS are as follows:

- It is centralized in Arkansas.
- Common systems and platforms are in use worldwide.
- The aim is to be merchants first and technologists second.

They are able to apply common processes and systems anywhere in the world, allowing people to move freely without significant downtime. The model is one of decentralized decisions but centralized systems and controls. Systems developers focus on systems that are easy to use, putting responsibility on the developer to understand the business, which they do by going into the business and performing the function first.

Wal-Mart has a set of critical success factors that every associate has to live by and in IS these include excellent customer service, testing and validation before roll-out, balance and controls, payback and ROI. Wal-Mart has built the company in large part on its efficient supply chain and inventory management, all of which is driven by, and dependent on, the flow of information. In the past ten years the driver of change has shifted from technology to information. The really strategic difference is the use of the information and how it is exploited and maximized. Wal-Mart is in a business that competes at the speed of information, so it must be presented in such a way that it drives execution and improvements in the business.

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## DATA QUALITY AND COMPATIBILITY

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There is an increasing need to integrate data from multiple dissimilar sources into, e.g. an e-marketplace hub, EAI platform or database. The quality of underlying data in systems, particularly CRM, is one of the major stumbling blocks to success. The number of different legacy systems making up a typical CRM system is around 80 and even if the integration of these goes smoothly there are problems associated with data consistency and quality. To accurately map source fields, it is important for middleware to completely understand the full semantic meaning of

each data source element and how it behaves over the entire scope of source data. Semantics-based integration tools are considered a kind of middleware that thinks, because they utilize a combination of natural language analysis, pattern recognition, artificial intelligence and other leading-edge cognitive technologies.<sup>10</sup> It is designed to eliminate the need to manually analyse and map each source's various meanings and then to re-map those meanings each time a new data format arrives. Semantics-based integration technology is being pioneered by a variety of software companies, including Contivo, Modulant Solutions, Network Inference and Unicorn Solutions.

The World Wide Web Consortium (W3C) is developing a Semantic Web that aims to unify the unstructured information scattered across the Web. The ultimate goal is to transform the Web from a display-oriented publishing medium into an environment where information can be interpreted, exchanged and processed.

#### **Case study 8.9**

##### **A US telecom company**

A US telecom company<sup>11</sup> found that when it combined its call-centre database and its marketing database it had 300 million customers – more than the total population of the US.

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#### **Case study 8.10**

##### **KeyBank**

KeyBank<sup>11</sup> wanted to write to its customers to gain their permission to use their personal data, following the introduction of the 2001 Gramm-Leech-Bliley Act in the US, and, more importantly, it wanted to write to each customer just once. This meant combining data from almost 30 data warehouses and individual systems. It had to comb through about 200 systems to make sure the information in those systems was up to date and complete. This process, which yielded 11 million customers, highlighted so many inconsistencies that executives decided to accelerate corporation-wide data governance and data quality initiatives.

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#### **Case study 8.11**

##### **Cincinnati Bell**

Cincinnati Bell,<sup>11</sup> part of Broadwing Communications, enables any service order entry for any product to immediately populate all of the company's data warehouses, including the company's website, which allows customer orders to be processed without human intervention. This has enabled the call-centre focus to switch from answering customer calls in the shortest possible time to selling additional products with real-time quality information readily available.

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## CONTENT MANAGEMENT SYSTEMS

According to the Butler Group:

*As the amount of digital content continues to proliferate, unstructured content such as e-mails, images and documents account for over 80 per cent of data in a typical business. Some form of content management is becoming essential for all organizations.<sup>12</sup>*

There are two main problems with management of e-mail content:<sup>13</sup> ■  
how to lose what you want to hide; ■ how to find what you need to retrieve.

The former can prove more difficult than simply pressing the ‘delete’ key, as a number of high-profile prosecutions have shown. One potential solution comes from software that can ‘expire’ both sent and received e-mails, or restrict a recipient’s ability to forward or print the material. Products from companies like Authentica and Tumbleweed Communications let senders encrypt outgoing e-mail and then provide recipients with conditional access to the decryptor key, which stays on the sender’s server. This means that everything from personal notes to top secret documents can be deleted after a specified time. Some allow a recipient’s viewing privileges to be revoked should a change in relationship occur. It is suggested that only 10–15 per cent of correspondence would merit encryption. Recent privacy legislation from Brussels has also prompted companies to take a look at e-mail management tools.

Equally, trying to find information stored in e-mail archives often can be difficult. Specialist companies, like Applied Discovery, can now categorize, manage, search and review electronic data from clients via a secure online ‘reading room’. KVS sells an e-mail search agent in Europe for Microsoft Exchange.

What the technology industry is offering is better ways to share information in chunks, remotely, but in a structured way so that we neither kill forests sending out reports nor waste our wisdom in random e-mailing binges. Sitting on top of existing technologies such as ERP, workflow, document management, content and knowledge management and intranets we now find the corporate portal – a simple personalized Web environment offering one view of all data and information sources. Content management functionality is now being embedded into portals, like mySAP Enterprise Portal, which converges with knowledge management in the provision of search and retrieval functionality from both internal sources and the Internet.<sup>14</sup> Content is an integral part of the business and is a product of every application and should be managed from a single repository as part of the infrastructure.



## ENTERPRISE PORTALS

### Definition

Gartner define a portal as:

*Access to and interaction with relevant information, applications and business processes, by selected target audiences and in a highly personalized manner.*<sup>15</sup>

Portals allow users to access all the information needed to do their job through a standard web-browser interface which can be customized to individual preferences. A portal hides users from the complexity and technology behind the scenes, making information from in-house software, external systems and the Internet appear like a single application. Merrill Lynch defined the enterprise information portal (EIP) as:

*A single gateway to personalized information needed to make informed business decisions.*

EIP technology utilizes a web-browser interface to give employees access in a single on-screen environment to various data and information systems they need to do their jobs more productively. It also makes it simpler for colleagues to interact with others, whether within a company or without. They are modelled on Internet portals like, Yahoo!, which enable a search to be carried out to extract the relevant information. Most portal products will allow search, retrieval, filtering, knowledge mapping, document management, workflow and personalization. Portals do not solve the incompatibility problems of proprietary software; they simply avoid them, by providing a gateway to look at things. By embedding application program interfaces (API) into the portals, often dubbed pagelets, portlets or gadgets, the need for complicated back-end integration between programs is eliminated, i.e. data gets integrated at the portal level. Portal software specialists include: Hummingbird, Corechange and Plumtree, which claims to have invented the idea and has among its clients BP, Airbus, the Highways Agency and Cadbury-Schweppes.

### Research

The Butler Group has warned that companies using portals must reassess the way ROI is measured.<sup>16</sup> The research company has seen an increase in the deployment of corporate portals and predict spend on the enterprise portal market to reach \$4 billion by 2005. This is despite reduced spend on IT, as portals are being seen as an important collaborative tool to support business decisions. Jacque Hale of the Butler Group has commented:

*There are no IT profits to be made by corporations – only business profits. This means that if the full potential of the portal is to be realized, IT managers must be able to measure ROI in terms of information productivity.<sup>17</sup>*

Martin Butler of the Butler Group believes that two-thirds of the value of large companies is made up of information and knowledge, and to overlook this issue is to devalue the business:

*Two-and-a-half to three per cent of revenue is the average amount spent by companies on IT, but 30 per cent of spend goes on managing information. So if you can make 10 per cent difference on the information process costs to your business, you're talking about something significant. That is where corporate portals can make a difference.<sup>18</sup>*

The Butler Group outlines the key benefits of portal deployment as:

- providing a single point of access to information;
- supporting better-informed business decisions;
- enabling collaboration between employees and with trading partners;
- integrating and personalizing the delivery of IT services.

A survey of organizations published in *Computing* in November 2001 showed that:<sup>19</sup>

8%	– already have a portal
35%	– planning to implement in next six months
26 %	– planning to implement in 12 months
5%	– planning to implement in over 12 months
16%	– have made no decision
10%	– do not plan to have a portal.

#### Case study 8.12

##### Hewlett-Packard

Hewlett-Packard<sup>20</sup> spent \$20 million constructing its employee portal in 2000 providing a gateway, called @HP, to 90,000 employees in 150 countries to, among other things, update human resources records, change benefit electives and book business trips. HP claims that in its first year it has delivered an ROI of \$50 million.

**Case study 8.13**

## Ford Motor Company

Ford Motor Company<sup>21</sup> replaced about 1 million documents as potential content on 1,500 intranets, each serving individual business units around the world, with a single portal called [My.Ford.com](http://My.Ford.com) for the whole organization, using Plumtree. This was selected for its extendibility, its ability to integrate with other applications including Documentum and eRoom and its strong content management features. This enables 50,000 staff in any part of the organization to retrieve information from other parts in addition to removing the need to maintain duplicate data on local intranets. Ford believes that the ROI for business-to-enterprise portals is driven by personalization, which can be defined as the delivery of individualized content through web pages or e-mail. One example of savings made by Ford is the use of its portal to display and access pay slips, which are estimated at \$18 million a year.

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**Case study 8.14**

## Herman Miller

Herman Miller,<sup>22</sup> an American office furniture maker, has 300 employees who spend most of their time in contact with suppliers, using a customized portal by Top Tier Software (now part of SAP) that gives them fast access to news and information. As such they are able to deal with business partners more effectively, because they do not have to hunt for or combine various bits of data. This initial success has led to several portals for internal uses being rolled out. Mike Brunsting, the firm's e-commerce team leader, said:

*The benefits for collaboration are amazing. For example, employees can decide what kind of alerts they want to have fed to their screens (supplier X is three days late with a delivery) and then drill down into data to identify the cause of the problem and potential ramifications.*

On the downside, while the technology is very good at sifting through structured data such as that contained in databases, at present it has trouble handling unstructured data, such as correspondence and CAD drawings.

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**Case study 8.15**

## Royal &amp; Sun Alliance

Royal & Sun Alliance (R&SA)<sup>23</sup> has been working with Corechange to implement working pilots to develop global standards and best practice in all of the 130 countries in which it does business. Ultimately, R&SA's 55,000 employees will be using portals to access all

applications and systems. It also plans to develop a single sign-on to help minimize the number of 'forgotten password' calls to the help-desk. They introduced Corechange's Coreport technology and Autonomy's search facility in September 2001, after a lengthy evaluation process. R&SA believe that the key to making portals work is ensuring that users feel comfortable. The CEO was most emphatic in saying they needed something that gave them the opportunity to maximize their knowledge assets and their business leaders in the heart of the business are actively using it.

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#### **Case study 8.16**

##### **BOC Group**

BOC Group<sup>24</sup> has started work on BOC2B, an ambitious scheme to provide a common view of information for more than 1 million customers in the UK and Australia. BOC believes it is important to look at portals, not as the answer to all business problems but as part of the solution jigsaw in which to fit other technologies and processes. BOC have found it hard to justify their CRM without a portal-based front end.

#### **Case study 8.17**

##### **The Inland Revenue**

The Inland Revenue<sup>25</sup> has completed a huge Web integration project to allow companies to check their tax liabilities online. The Revenue has been working on the initiative with its outsourcer EDS and middleware supplier BEA since April 2001. Data from the Revenue's mainframe will be accessible via the Internet and it expects 90 per cent of businesses to use it. The customer front end has been built by the people responsible for 'Egg' and 'If'. The enterprise architecture layer (middleware) picks up the data from the back end and puts it into a data cache from which the applications can pull it. Data will be loaded into the cache overnight and then returned updated to the mainframe. The portal will also include an e-workspace, a shared repository of agreements between the Revenue and individual companies.

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#### **Case study 8.18**

##### **Orient Express**

Orient Express<sup>26</sup> has replaced the individual HTML sites of its 30 hotel and train companies with a Web portal to combine its travel services under one corporate banner, using a Tridion Web content management package and Broadvision's personalization software, with Web design agency, Nucleus, responsible for design, build and training. The portal, costing £1 million, replaces a system that required changes from each site to be faxed to an agency for updating. The new portal allows each decentralized business to develop their own microsites, using a web-based interface developed by Web content specialist, Tridion, to

build, update and develop their own presence within the portal. This is particularly important for localization of foreign websites. Online bookings for Orient Express Trains have already increased tenfold. E-commerce director, Brian Tickle, explains:

*We spent a lot of time planning what was needed, there was a lot of pressure to get online quickly. But planning was so valuable and sifting what's important is the key.*

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# Supply/demand chain management

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## INTRODUCTION

Supply/demand chain management (S/DCM) involves the coordination of all supply activities of an organization from its suppliers and delivery of products to its customers. This supply chain is divided into two parts:

- upstream supply chain – buy-side e-commerce (see Chapter 10 on e-procurement);
- downstream supply chain – sell-side e-commerce (this chapter).

Figure 9.1 shows the two parts of the S/DC together with the, often complex, links to suppliers and partners and their suppliers and customers and partners and their customers – more accurately termed a supply chain network – now found in typical twenty-first century organizations, with both sides regularly utilizing buy-side and sell-side intermediaries such as distributors, agents and B2B exchanges.

Fig. 9.1 | Supply/demand chain networks

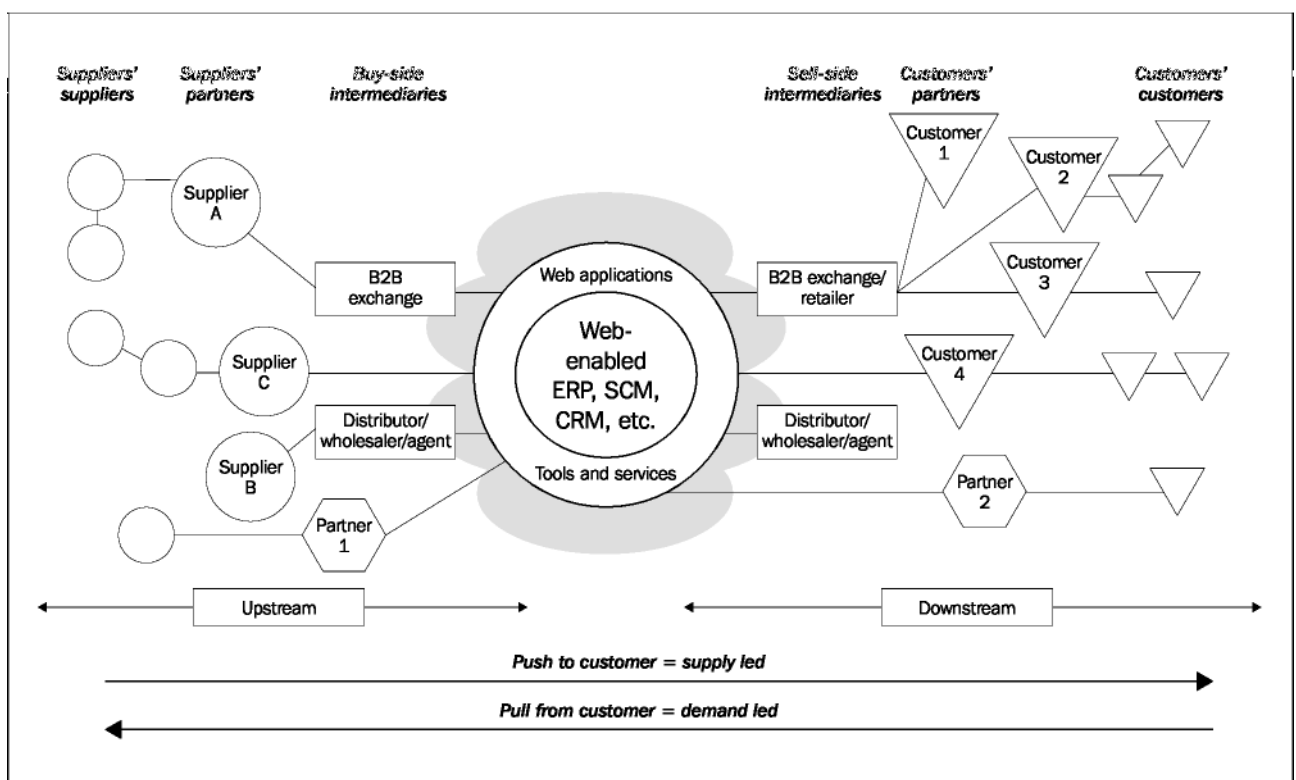


Figure 9.1 also illustrates that when products are produced and then pushed to customers it is a supply-led chain; on the other hand, when the customer is involved in specifying the products to be produced, it is a demand-led chain. The demand chain (DC) focuses all its resources, including production, R&D, sales and marketing, and customer services, on consumer demand.<sup>1</sup> It involves a radical change in thinking that takes the company, its SC partners and its systems into a new business environment. The demand-driven business model uses technology to focus on the consumer's actual

demand behaviours, employing sophisticated forecasting, market research and business intelligence to drive improvements through the demand chain. The results are:

- increases in revenues and profitability (profit is a key performance indicator for the demand chain);
- reductions in inventory;
- improvements in product management;
- sharper focus on profitable, value-adding customers.

Figure 9.2, looks at the characteristics of S/DC. The SC looks for efficiencies, e.g. how can we lower manufacturing cost per item? Whereas the DC focuses on effectiveness, e.g. are we making the right products? Are they what the consumer wants? Are they profitable? Revenue generation, not cost, is the key driver. The focus is on longer-term planning rather than short-term control and capacity constraints. For example, a retailer can use an e-DCM system to simultaneously manage demand online from, say, multiple high street, Web purchase and catalogue sources in real-time, analysing consumer demand patterns minute by minute and balancing inventory across all three.

**Fig. 9.2** Characteristics of supply/demand chains

Supply-led	Demand-led
<p>Increased efficiency</p> <p>e.g. how can we lower the cost per item?</p> <p>Focus on: reducing cost in the supply chain</p> <p>Emphasis on: short-term control and capacity constraints</p> <p><i>Results:</i> e-business and partnerships developed</p>	<p>Greater effectiveness</p> <p>e.g. are we supplying the right products?</p> <p>Focus on: how to generate higher revenues from customers</p> <p>Emphasis on: longer-term planning, market research and business intelligence</p> <p><i>Results:</i> improved product management, reduced inventories</p>

Building an e-commerce S/DC requires integration not only with back-office finance and payment systems but equally all along the value chain to suppliers and their suppliers. Many organizations have already gone through the pain of re-engineering their internal processes to install integrated ERP and for them this extension to link to other businesses is an easier, if not an essential, first step.

There are five basic components for S/DCM:<sup>2</sup>

- *Plan* – this is the development of a strategy for managing the S/DC for greatest efficiency and effectiveness.
- *Source* – this involves selecting the suppliers of goods and services needed in the S/DC; developing pricing, delivery and payment terms; relationship management; goods in, storage and payments.
- *Make* – this covers demand planning, manufacture, assembly, testing, packing, delivery to stock.
- *Deliver* – this covers receipt of customer orders, warehousing, picking and delivering, invoicing and payment.
- *Return* – this requires the creation of processes for managing goods that are returned from customers including those that need repair and for monies to be refunded.

At each stage, monitoring and measurement systems need to be put in place to provide information for all parties to the chain and to monitor performance, efficiency and effectiveness.

The Gartner Group predicts that by 2004 supply chain e-markets will become a commonly accepted alternative for in-house management of supply chain information.<sup>3</sup> This view is shared by Koulopoulos, who examined 600 of the Fortune 1000 companies and concluded that the use of electronic trading networks has been growing so fast since the late 1990s that, if the pace continues, nearly all businesses transactions will take place over some form of electronic exchange by 2005 .

Major software vendors in this marketplace include Ariba/i2/IBM, SAP/Commerce One and Oracle. The situation is similar to the advent of fax machines and because it requires all participants to buy into the technology at the same time, several larger organizations now make web-enabled services a mandatory part of their tenders.

## SUPPLY/DEMAND CHAIN STRATEGY

The S/DC in many organizations can consume well over 50 per cent of a company's operating expenses. It is therefore an obvious area to explore and exploit in the search for business systems improvement. The process of examining processes to effect improvement, i.e. business process re-engineering (BPR), is explained in detail in Part Four (*see* Chapter 14, pp. 173–79). It is unlikely to be possible to move the entire S/DC to the Internet at one time so it may be necessary to have a strategy of phased implementation starting with the areas where the greatest impact and ROI can be achieved.

### **Case study 9.1**

#### **Premier Paper**

Premier Paper<sup>5</sup> has installed 'Deliver-e' to web-enable its existing ERP order processing, so that customers can view the firm's inventory levels online and make orders. Most of the additional work involved producing online catalogues. The company calculates that the increased business will pay for the project within a year, citing a recent deal won because they could take orders 24 hours a day and deliver their supplies within three hours.

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### **Case study 9.2**

#### **General Motors**

General Motors (GM) is undertaking an EAI deal that will allow it to develop a new vehicle model within months rather than years. A web-based order-to-delivery (OTD) system, using software from SeeBeyond, makes information available instantaneously from the minute the customer places an order, which is forwarded to dealers and its logistics operation. It also intends to make this service available to its Covisint marketplace partners involving the need to link its 3,000 internal systems with its subsidiaries and 30,000 partners.

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### **Case study 9.3**

#### **Clarks Shoes**

Clarks Shoes is working with CSC and i2's Rhythm package to mend weak links in its supply chain, e.g. enabling it to phase products out of the company's inventory near the end of their lifecycle. It also allows comparisons between each factory's production costs and schedules, enabling it to find its most effective channel for delivering orders.

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## **Implementation costs**

According to Gartner, the real costs of implementing S/DCM can be as much as five to ten times the licence fee costs and might include the following:<sup>6</sup>

- application licensing and maintenance fees;
- implementation costs including consultancy fees;
- integration costs;
- content aggregation and rationalization costs;
- maintenance costs;
- catalogue/search engine fees;
- transaction costs;
- supplier enablement costs;

- end-user training costs;
- process re-engineering costs;
- associated licensing costs – database and integration licences;
- various administrative costs;
- marketplace participation costs.

## E-MANUFACTURING

### Product lifecycle management (PLM)

The PLM market covers everything from now well-established mechanical CAD software to new web-based tools allowing non-engineers access to ‘lite’ versions of 3D data.<sup>7</sup> The biggest growth area, increased by 54 per cent, is in collaborative product commerce and visualization software, which helps companies plan factories and production digitally. Companies that have been using digital mockup software to save time by reducing the need for physical mock-ups or prototypes can now use the Internet as a communications vehicle, giving all their suppliers access to the digital data. In the same way, 3D digital data can be made available to functions such as purchasing or maintenance departments. For example, United Airlines gives their maintenance staff online access to 3D design data using Dassault Systems software.

The automotive industry is pioneering PLM to:

- reduce product development times and costs – using software tools to design in cyberspace, to remove the need to use clay models or conceptual drawings;
- run globalized production more efficiently, by supporting their platform strategies maximizing re-use of parts, designs and production processes;
- increase build-to-order;
- push more design responsibility down to first-line suppliers;
- forge stronger links with customers via e-tailing;
- achieve bigger participation in the after-market.

### Production

E-manufacturing solutions enable the business to see what orders are where, what problems have occurred and precisely how much capacity remains – essential in a web-enabled make-to-order environment. It involves a strategy to jointly leverage Internet technologies, collaboration with partners, electronically-driven workflow and a company’s own core manufacturing competencies. Outsourcing in

manufacturing has really taken off in the electronics sector, with 40 per cent being outsourced in 2000. Companies, like Cisco, recognize that their assembly operations are non-core to their businesses, owning only two of its 40 factories.

#### **Case study 9.4**

##### **British American Tobacco**

*British American Tobacco (BAT)*<sup>8</sup> has its main manufacturing centre in Southampton, a complex international supply chain and markets that vary a great deal in terms of volatility of demand and range of product required. Their old spreadsheet-based planning system had tended to operate high levels of inventory. BAT chose i2 software because of its Supply Chain Planner (SCP) software suite, which runs in parallel with SAP R/3 at the Southampton plant creating efficiencies in the manufacturing supply chain process. It allows BAT to model changing market characteristics and deal with customer complexity and unforeseen constraints in addition to improving customer service and reducing inventory levels.

## **FRONT-END SYSTEMS<sup>9</sup>**

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#### **Case study 9.5**

##### **IMI Norgren**

*IMI Norgren*, the pneumatic controls manufacturer, uses a range of ERP systems at its plants in Europe, the US and the Pacific. It has a turnover of £435 million and handles more than 200,000 part numbers, with more than half of its shipments assembled to exact customer specifications. When it decided to start selling over the Internet it committed itself to integrating all its different back-end systems to one single Web front-end. Entegrity Solutions developed a software exchange with an API that enabled it to connect to any back-office system. It allows customers to track orders, account status and parts availability. Overall cultural issues were the hardest with Marketing driving the project. The first pilot took place in the UK within 14 weeks of starting work.

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#### **Case study 9.6**

##### **The Stralfors Group**

*The Stralfors Group*, the Swedish integrator, has cut the cost of fulfilling supply requests by up to half by implementing the TradeIT order handling system, but the company insists this is only one of several benefits. It integrates a web front-end with a back-end ERP system. It was installed in 1999 at its IT supplies division and estimates that it saves 10 per cent on order handling via the Web compared to phone or fax, with customers making similar savings. When customers link their e-procurement systems then costs can be slashed by 50 per cent for both parties. It lets customers control their employees' purchases, improves

lead times and gives real-time information. Its back-end systems can return real-time order confirmations to customers, plus details of delivery dates and costs; if goods are not in stock it issues orders for replenishment. After one year the web-based system accounted for half their order intake.

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## LOGISTICS

The challenge for logistics is to deliver the promise made to the customer and allow customers to track deliveries while in progress, as has become the custom with couriers such as DHL.

### **Case study 9.7**

#### **Ford**

*Ford*<sup>10</sup> use UPS Logistics Group, who provide a variety of supply-chain management services. UPS operates by looking at the client's entire SC, acting as consultants to create a network design that optimizes performance, and then manages the SC for a minimum of three years. UPS manage all the finished vehicle delivery for Ford within the US. Along that supply chain UPS collect the finished vehicles from the manufacturing sites, get information on stocks, collect information and track the vehicle as it goes through the different modes of transport to Ford's 6,000 dealers, utilizing as much as possible real-time information about where each vehicle is along the supply chain, not by shipment or railcar but by individual vehicle. This makes rerouting of deliveries during the process possible. After a year of operating under the new system, Ford announced a 26 per cent reduction in vehicle delivery times, \$125 million savings in annual inventory carrying costs, and \$1 billion a year in inventory reductions. Not surprisingly, Ford has now hired UPS to use the same web-based systems in Europe.

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## E-TAILING

According to McKinsey research, just 15 per cent of all websites accounted for 85 per cent of all revenues. The best companies' websites made it easy to buy and easy and secure to pay, with web pages downloading quickly and 95 per cent of orders delivered on time. Tesco, Amazon and Wal-Mart are good examples of companies who have learned how to attract prospects, convert them to customers and then retain them. With e-commerce, companies only have one chance to win and keep a customer. Research by PLAUT consultancy, exposed fundamental flaws in the way in which e-commerce businesses handle the after-sales element of the sales process, including both wholly inappropriate standard responses to e-mail queries and incorrect amounts refunded when goods were returned.<sup>11</sup>



PLAUT suggest that implementing all or some of the following recommendations should improve the online customer service flaws highlighted in the study:

- Give one person responsibility for the overall customer buying process and value chain execution.
- Ensure cultural and organizational alignment is focused on the customer.
- Understand your systems and processes and ensure they work as efficiently as possible.
- Test and retest your systems extensively.
- Clearly display cancellations and returns policies and adhere to them.
- Aim to centralize all customer communication.
- Communicate quickly.
- Refund money promptly.
- Make the cancellation and returns process simple.
- Aspire to treat customers as individuals. These points could equally be applied when trading through traditional channels.

#### **Case study 9.8**

##### **Tesco**

Tesco was the first of the UK supermarkets to offer Internet shopping in 1997. Tesco Direct has 500,000 signed-up customers, covered half of the UK by 2000 and continues to be rolled out at the rate of five additional stores a week. Turning over £250 million in 2002, it has become the world's leading Internet grocer. Maintaining customer access to the website is crucial, so Tesco's web servers operate in a load-balanced cluster and access the Internet through a broadband link that is linked to sophisticated system monitoring. Unlike Sainsbury's who have built dedicated distribution depots and a separate infrastructure for the web business, Tesco piggy-backs on the retail stores' business for fulfilment purposes.

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## CONSUMER MARKETPLACES

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#### **Case study 9.9**

##### **eBay**

eBay,<sup>12</sup> the original C2C auction site that went public in 1998, is expecting to turn over \$3 billion by 2005 and has been profitable, unlike other online retailers, from a very early stage. eBay does not hold inventory, move goods or transfer payments – the 15 million registered users do most of the legwork, posting and haggling over about 4 million items for sale in

over 4,000 product categories. As the ultimate middleman and serving as facilitator, it has successfully skirted the usual e-commerce pitfalls of procurement, merchandising, inventory risk, order fulfilment and shipping. eBay does not police the transactions but believes in a sense of community and is convinced that people are basically good and trustworthy. Instead, buyers who are disgruntled can gripe about it on the Feedback Forum, which buyers can check out before making a purchase. Interestingly, eBay does not run the typical banner ads, only allowing advertising that enhances the core selling proposition.

eBay have now moved into B2B auctioneering, dubbed the Business Exchange, operating a virtual trading floor where businesses can bid for office equipment, for example. They also conduct fixed-price commodity sales for larger companies, using the site as a distribution channel, and have formed alliances to create co-branded sites such as eBay Motors working with [AutoTrader.com](http://AutoTrader.com), and eBay Real Estate with [zipRealty.com](http://zipRealty.com).

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Other organizations, seeing eBay's success, are moving into B2C online auctions. In 1999 Dell, Microsoft and more than 100 other companies announced they have linked their websites, along with 46 million users, to a new auction platform run by FairMarket. In May 2000 [Amazon.com](http://Amazon.com) reported it had increased the number of items listed for auction or fixed price bid to 2 million. Even traditional retailers like JC Penney have set up online operations to feature catalogue overstock merchandise. They see auctions tying into their three-channel strategy for distribution: stores, catalogues and the Internet.



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# E-procurement

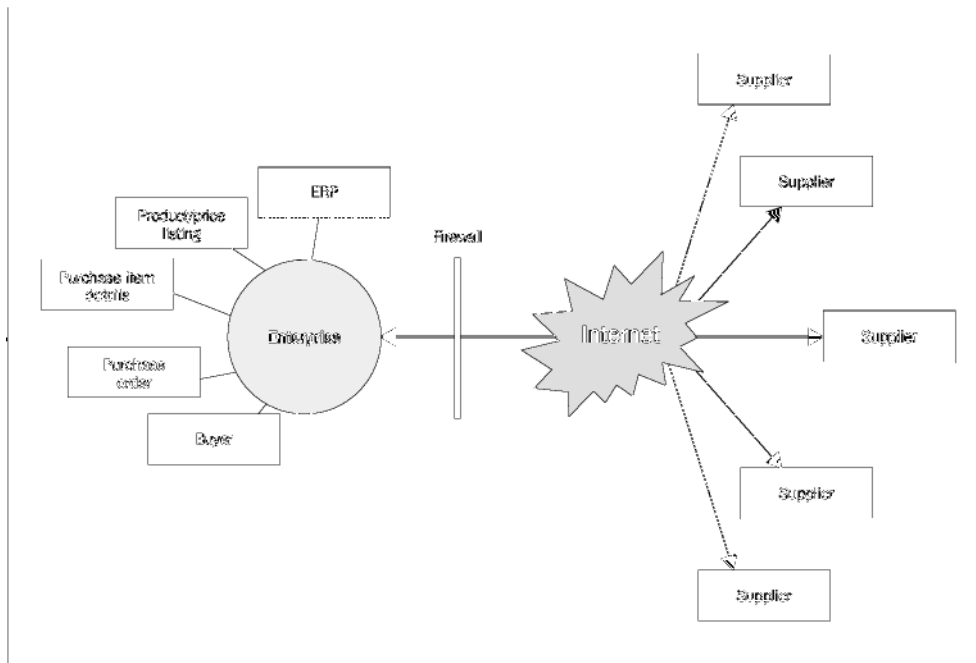
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## INTRODUCTION

E-procurement is the electronic acquisition of goods and services, which can include any stage from identifying the needs for goods through to contract management (*see* Figure 10.1).

**Fig. 10.1** E-procurement



It works upstream in the S/DCM process and covers the five ‘rights’ of purchasing:

- right price
- right time
- right quality
- right quantity
- right source.

Some large companies like Cisco, GE and Volkswagen are using advanced e-procurement models.<sup>1</sup> When Microsoft adopted e-procurement the average transaction cost was reported to drop from £145 to £5.

The tangible benefits of e-procurement can be assessed in three broad areas of activity:

- *Transactional efficiency* – the average processing time from requisition to dispatch for indirect goods and services is 14 days. In the UK the average cost of a B2B purchase is £80 and in the US it is £102. Using e-procurement transaction costs are reduced by up to 80 per cent and processing time cut from days to hours.

- *Supply market management* – stocks are managed more effectively, collaborative planning and execution across the whole value chain is enabled, quality information is available, there is greater focus on strategic sourcing and aggregation of small orders is possible.
- *Supply chain restructuring* – processes can be streamlined, restructuring of B2B relationships through consortia and trading communities and alliances.

The business case for e-procurement, according to PwC Consulting,<sup>2</sup> usually includes savings of up to 15 per cent from contract compliance, with further sums from supplier leverage, improved S/DC visibility and cutting order processing costs. The benefits of e-procurement are summarized by Turban et al. as:<sup>3</sup>

- reduced purchasing cycle time and cost;
  - enhanced budgetary control (achieved through rules to limit spending and improved reporting facilities);
  - elimination of administrative errors (correcting errors is traditionally a major part of a buyer's workload);
  - increasing buyer's productivity (enabling concentration on strategic purchasing);
  - lowering prices through product standardization and consolidation of buys;
  - improving information management (better access to prices from alternative suppliers and summaries of spending);
- improving the payment process.

## Payback

### Case study 10.1

#### Credit Suisse First Boston

*Credit Suisse First Boston (CSFB)*<sup>4</sup> went live with the Peoplesoft e-procurement module as part of an ERP installation in 2001 across 850 business units responsible for a spend of over £1.9 billion. It has given the company's 10,000 purchasing users a much clearer picture of the supply chain, lowered costs and reduced headcount. CSFB are on target to achieve savings of £23.9 million over the first three years and the bank is likely to exceed an initial ROI of 277 per cent with cost per transaction dropping from £170 to £34 while the electronic catalogue has saved around £13.6 million. CSFB said:

*Before we couldn't identify what we had spent our money on and multiple systems and processes were costly to manage.*

### Case study 10.2

#### AstraZeneca

*AstraZeneca*,<sup>5</sup> the pharmaceutical company, is aiming to cut at least £600 million a year from its purchasing bill by using electronic procurement. The UK operation is set to be the first to use it by the end of 2002. The Ariba spend management suite has been selected; the sourcing module will allow the company to negotiate better contracts with suppliers and the procurement module will physically do the buying transactions. It will be used for the purchase of indirect goods, including R&D equipment, which currently account for over £4 billion annual spend. A company senior manager said:

*Experience has shown that a conservative view [of savings] looks at 10 per cent and in the longer term up to 20 per cent would not be unreasonable.*

### Case study 10.3

#### Rolls Royce

*Rolls Royce*,<sup>6</sup> the £63 billion UK aircraft manufacturer, found that 90 per cent of parts represent only 1 per cent of value and little attention was paid to them. However, neglecting this area resulted in these parts often being out of stock or in over-supply, causing havoc for assembly lines and warehouses. The solution was to hand over in 2000 the management of its entire small parts inventory to supply chain specialist, Umeco, under an 11-year deal, leaving in-house to concentrate on the high-value, low-volume items. Umeco has hit its service level targets, providing complete availability of all components at every Rolls-Royce site, a 40 per cent improvement. Other inventory management firms include Exel and Tibbett & Britten.

## PROCUREMENT MODELS

Purchases fall into two broad categories:

- *production-related* procurement, including raw materials for production and maintenance, repairs and operations (MRO) of manufacturing facilities;
- *non-production* related procurement such as catering, travel, training, office supplies and furniture.

There are two main methods of purchase:

- *systematic sourcing* – negotiated contracts with regular suppliers;
- *spot sourcing* – generally fulfilling an immediate need for commodity items.



There are three models of approach to links with suppliers:

- *Buy side.* A many-to-one trade transacted via the buyer's website, who has responsibility for maintaining data:
  - *Internal only* – where staff buy from the online catalogues of preferred suppliers. Here internal efficiencies, such as eliminating maverick buying from unapproved suppliers and reduced paperwork through automated procurement process, can be realized.
  - *Shared* – where suppliers monitor buyers' inventories and replenish them as required. Here automated e-procurement modules or ERP is beneficial. Partners must have a good partnership relationship and trust one another.

#### Case study 10.4

##### The Halifax

The *Halifax* has an e-procurement website integrated into its core procurement system to provide E2E 'req-to-cheque' functionality that handles invoice matching and payment. In building relationships with suppliers the Halifax recognizes that the rules and information requirements are different for each supplier to maximize cost reductions and improved services. The Halifax is developing a set of collaborative commerce portals to address the specific procurement requirements of each supplier, with XML documents being transmitted.

- *Sell side.* A one-to-many trading relationship carried out via the supplier's website, with the supplier having responsibility for maintaining data. It requires the supplier to operate a different interface for each customer website. This approach is widely used by B2B auction sites and supplier B2B catalogues or clearing houses. Here companies like DoveBid and Equipp conduct auctions online. Other sell-side technologies are providing improved customer service and cost efficiency.
- *E-market.* A many-to-many trading relationship with multiple buyers and sellers brought together by an online intermediary. Alternative terms are electronic marketplaces, e-markets, net markets, trading portals and trading hubs (*see next section*).

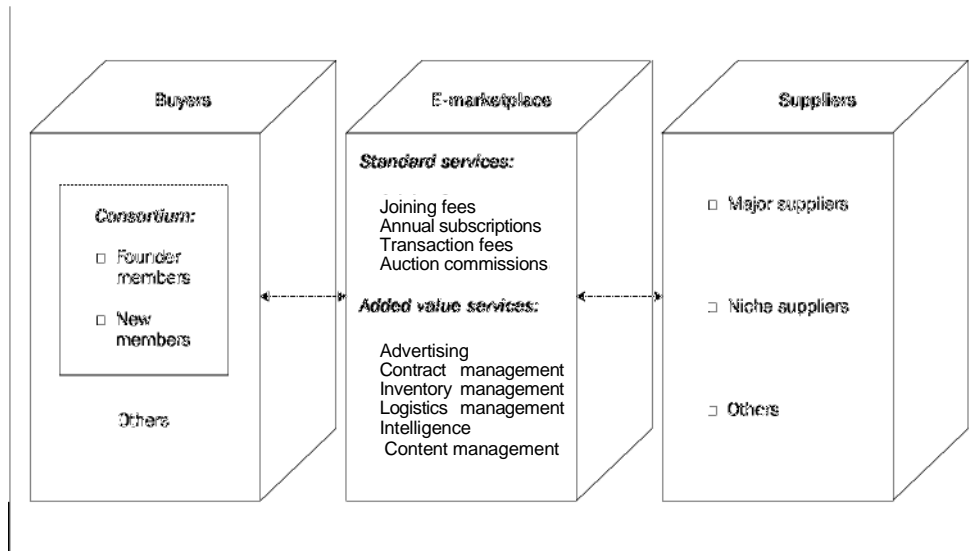
## E-MARKETPLACES

### Introduction

Digital marketplaces bring buyers and sellers together globally in online marketplaces that allow companies to exchange information, source products and services and execute online transactions, through online catalogues, hubs and auctions. Many

offer additional services and are known as metamediaries. Others use intelligent software agents that assist in performing tasks, e.g. the [Building-Site.com](http://Building-Site.com), who use Enterprise Activemarket to match online buyers to sellers. (see Figure 10.2).

**Fig. 10.2** The e-marketplace



There are three main types of B2B exchanges.

### Private trading exchanges

Private trading exchanges (PTX) are owned and run by one company to manage its own trading-partner relationships. Examples include Cisco, Dell and Volkswagen, who have led the way in S/DCM. These form a one-to-many network, not to be confused with old-style EDI where the technical barriers for participation made it only accessible to very large organizations.

#### Case study 10.5

##### Hewlett-Packard

*Hewlett-Packard (HP)*<sup>7</sup> decided in 2000 to increase the efficiency of its direct materials procurement by moving to a private e-marketplace, utilizing i2 software Supply Chain Collaboration as the basis for forecasting and inventory collaboration. Its goal was to put 80 per cent of its procurement process on the Internet by 2004 and to measure the benefits of doing that along the way. HP had 83 product organizations and supply chains and a culture of real autonomy. Decentralization needed addressing because each development undertaken by a different division had not been well leveraged from one division to another. On average in the first year it has made a 10 per cent saving in material sourcing costs and increased the amount it makes from being able to sell off excess inventory to around 80–90 per cent.

### Case study 10.6

#### Cisco Systems

*Cisco Systems'* e-Hub links 2,000 supply chain partners and includes software tools for improving planning and event management. Phase II covers planning optimization using Manugistics software tools, which will provide greater flexibility for managing constraints within its contract manufacturing base and speed response to supply chain problems. Phase III will

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### Case study 10.7

bring design collaboration across the e-Hub in 2002.

#### General Electric

*General Electric*<sup>8</sup> has extended e-procurement activity to direct purchasing. For this it created its own global supplier network which links 1,500 corporate buyers to 16,000 suppliers. Over the first 19 months 20,000 e-auctions worth \$16 billion were completed through this route. The system is used for buying everything from travel, IT and photocopying to direct purchases like aircraft engine components. GE offer the following tips to achieve benefits:

- Preparation is key.
  - Train both suppliers and buyers.
  - Use dummy practice events to improve confidence in using the tools.
  - Keep auctions simple; limit the number of line items involved.
  - Use different auction formats and select the most appropriate for each event.
  - Treat your suppliers ethically – e-auctions should be 'squeaky clean'.
  - Manage the auction process during the event.
  - Manage post-event activity.
- 

## Independent exchanges

Independent exchanges are many-to-many network, which can be either vertical or horizontal.

### *Vertical (IVX)*

An IVX connects many buyers to many sellers in a vertical market segment, often offering services for smaller companies as a type of ASP-plus value-added model and manufacturing input marketplaces for a particular industry sector. Examples:

- *Build-on-line* is aimed at the European construction industry. It allows the buying and selling of materials and services, while supplier catalogues and project management tools for joint projects can be obtained. Industry news is available and subscribers are able to chat with others in the industry.

- *Constructeo*, in the construction industry, offers project management and planning tools for very specific customer niches. It already manages 24 projects, offers four supplier catalogues and runs online auctions.
- *elogistics* is an example of the UK freighting services industry.
- *Band-X*, launched in 1997, works with telecoms, ISPs and large corporates to trade bandwidth-telephone capacity. It enables unwanted IP capacity to be traded in real time.

#### Horizontal (IHX)

An IHX connects buyers and sellers in any industry. Often MRO and non-production items (NPI) are sold in this way. Examples:

- *E-Exchange* for procuring hi-tech equipment.
- *Infobank* for goods, including IT and stationery supplies. It is used by National Power, for example, which has reduced its average purchasing cost per item on office supplies from £50 to £10.

#### Consortium trading exchange

A consortium trading exchange (CTX) brings together major industry players who are seeking to reduce transaction and product costs and speed up the delivery chain. Care must be taken that cooperation does not lead to the setting up of a cartel. Most of the major industry consortiums have now been established. Examples:

- *Transora* was launched in 2000 for the food industry, representing 40 per cent of the global consumer products industry including Unilever, Kraft, Kellogg and Coca-Cola.
- *Covisint* covers the motor industry, including Ford, Daimler Chrysler and General Motors, where groups and companies bid for materials and services.
- *Metalspectrum*, with 20 backers, is one of half a dozen established e-marketplaces for the metal industry.
- *Chemconnect* is one of half a dozen sites in the chemicals industry.
- *Eutilia* covers the utilities sector.
- *IdeaMarketplace* covers local government.

Hybrids are also developing where companies are using public e-marketplaces for purposes such as searching for new suppliers, comparing prices and sitting in on auctions. Some are able to offer a private negotiation room and keep their communications, negotiations and transactions private. Others are offering added value services including certification, credit approval, decision support, performance tracking and acting as financial clearing houses.

According to Datamonitor about a third of these large-company, collaborative exchanges have been consigned to history.<sup>9</sup> Collaboration between competitors in some industries has proved rather more elusive than first predicted. Instead larger companies have switched focus to portals and private marketplaces, which can be more customized and focused on achieving competitive advantage, with some seeing the benefits of continued links to public marketplaces as well. Public exchanges are switching some of their focus to providing value-added services, particularly to SMEs.

Some of the reasons for the high failure rate include:

- the reluctance to collaborate with competitors because of issues such as the ability to differentiate products;
- the discovery by participants that collaboration is as much about people and changing business processes as it is about technology. Change is hard enough to achieve on a one-to-one level but when you have process realignment by committee across companies then it can be very difficult;
- the realization that the culture of the particular industry is an important factor in success or failure;
- the recognition that the trading exchange activity cannot exist as a point solution but has to be integrated with ERP as an extension of the back office;
- the costs of public marketplaces charged out through membership and transaction fees passed on to users was seen as too high in some industries;
- the time taken to establish and the funds needed were greater than originally estimated.

Marketplace features for buyers include:

- knowing what the best price is;
- which supplier has products available for delivery;
- who else makes the product/service or a suitable substitute;
- competitive online auctions (reverse auctions) between suppliers which reduces prices;
- convenience and transaction timeliness;
- one-stop-shopping experience;
- reduced transaction costs, particularly when hubs integrate sourcing, purchasing and billing;
- management of capacity utilization, increases in inventory turns and optimization of cashflow;
- more control over procurement process;
- more visibility of the supply chain;
- ability to monitor performance of different suppliers.

Marketplace features for sellers include:

- reduction in the cost of acquiring new customers;
- the need to provide an electronic catalogue;
- reverse auctions which are useful to sell obsolete stock;
- convenience and transaction timeliness;
- aggregation of small orders;
- management of capacity utilization, increases in inventory turns and optimization of cashflow;
- reduced transaction costs when hubs integrate sourcing, purchasing and billing;
- increases in the accuracy of order taking;
- use of digital audit trails to profile customers and customize marketing programmes;
- allowing smaller players to compete with larger ones;
- easier comparison of competitors' products and prices;
- creation of opportunities to collaborate.

## OPEN STANDARDS

Buyers are keen to use open, global standards in the automated e-procurement space, in order to standardize content and allow freedom of supply. The Electronic Commerce Code Management Association (ECCMA) launched its attribute table, the Electronic International Attribute Code (EIAC), which defines the characteristics of a commodity, enabling users to search the Web to source every supplier who produces that product providing they are using the common code. To do this ECCMA is working with Universal Standard Product and Services Classification (UNSPSC), a global coding system that classifies products and services, supported by major vendors like SAP, Oracle, Ariba and i2. Open standards increase interoperability between systems as well as interconnectivity because everyone is exchanging consistent, standardized content. As a non-profit-making organization it issues everything free over the Internet, without copyright over the codes or licence fees.

### Case study 10.8

#### Unilever's NPI Initiative<sup>10</sup>

##### *Background*

Anglo-Dutch Unilever is one of the world's largest companies with a turnover of €47.6 billion. It is a global consumer goods business created over 70 years ago with many well-known foods and home and personal care brands purchased by 150 million people each day. In

2000 it announced a major growth and brand rationalization programme setting out ambitious performance targets for the coming years.

Unilever's supply savings programme is one of the cornerstones of its Path to Growth Strategy towards the implementation of a world-class supply chain:

*Unilever's 'Path to Growth Strategy'*

- *Reconnect with the consumer* – to anticipate the future.
- *Focus the brand portfolio* – reflecting consumer appeal and growth potential.
- *Pioneer new channels* – to be in the right place at the right time.
- *Develop a world-class supply chain* – simplifying sourcing, manufacture, marketing.
- *Simplify the business* – reducing complexity.
- *Build an enterprise culture* – towards a single-minded passion for winning.

This initiative is expected to contribute substantial savings through effective leverage of size and scale enhanced by common business processes and simplification of complexity. In a similar way to the buying of many production items, Unilever has equally recognized the importance of implementing a global supply management programme focused on reducing non-production items (NPI).

#### *Strategic sourcing*

The NPI organization model being implemented in both Europe and North America (which will be extended to the rest of the world) is founded on clear cross-business governance and effective executive buying. Strategic sourcing is being supported by the global roll-out of e-procurement and participation in some key exchanges, particularly in Transora, where an equity stake is held. Regional and a few global NPI cluster teams have been formed which are undertaking a rigorous methodology to deliver the strategic sourcing strategies and implementation plans required to achieve the targeted savings.

Historically the majority of NPIs have been purchased locally, although there has been an increased move towards national and, in a few instances, transnational negotiations. European and to some extent global supply markets are becoming well established, enabled in many instances through e-procurement. In such areas as IT hardware and software, travel and accommodation, energy, logistics and fleet management, European and in some cases global supply markets and suppliers already exist. European markets are also emerging for office facilities, telecommunications, marketing point-of-sale items and technical supplies.

#### *E-procurement*

Unilever meets two of the key corporate strategic thrusts – *World-class supply chain* and *Simplification* – by implementing *NPI strategic sourcing* and *e-procurement enablement*. These are two of the six thrusts for the implementation of world-class supply management:

- Implement executive buying.
- Attract, develop and retain world-class buyers.
- Professionalize NPI sourcing.
- Enable e-procurement globally.

- Accelerate and leverage simplification.
- Drive information and measurement.

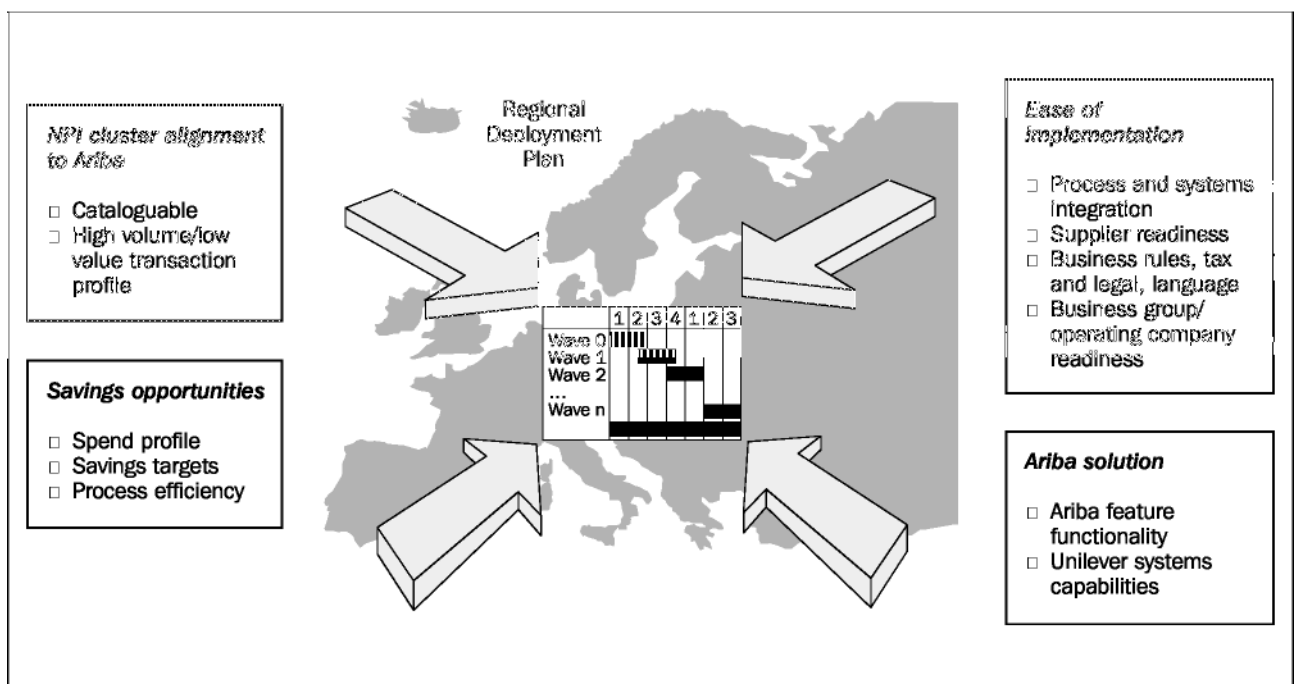
Aggregation of demand and access to new suppliers through real-time partnership will enable Unilever to improve efficiencies of the extended supply chain. Workflow automation will help simplification of the internal processes, which will create scale for Unilever to leverage. For Unilever e-procurement represents the opportunity to sustain the benefits gained from strategic sourcing through information, compliance and business process simplification.

There are four ways of defining the benefits of e-procurement:

- It is a structural enabler for re-engineering the NPI procurement process, enabling further benefits to be gained through strategic sourcing, business simplification, visibility of total spend and effective integration routes both internally, e.g. ERP, and externally.
- It is the means for conducting electronic business upstream using lowest cost links, i.e. cXML.
- It is a business model prompting re-evaluation of the mechanisms for connecting customers, enterprises and suppliers (including exchanges and marketplaces).
- It is a single front-end interface both externally to suppliers and internally for ERP and other areas of integration.

Strategic sourcing savings opportunities and perceived e-procurement readiness are among the key criteria applied for prioritizing and scheduling global roll-outs. The other drivers are ease of implementation, infrastructure capabilities, the availability of suppliers and their ability to manage interfaces with the business and, where required, with B2B exchanges (see Figure 10.3).

Fig. 10.3 | Unilever – regional roll out



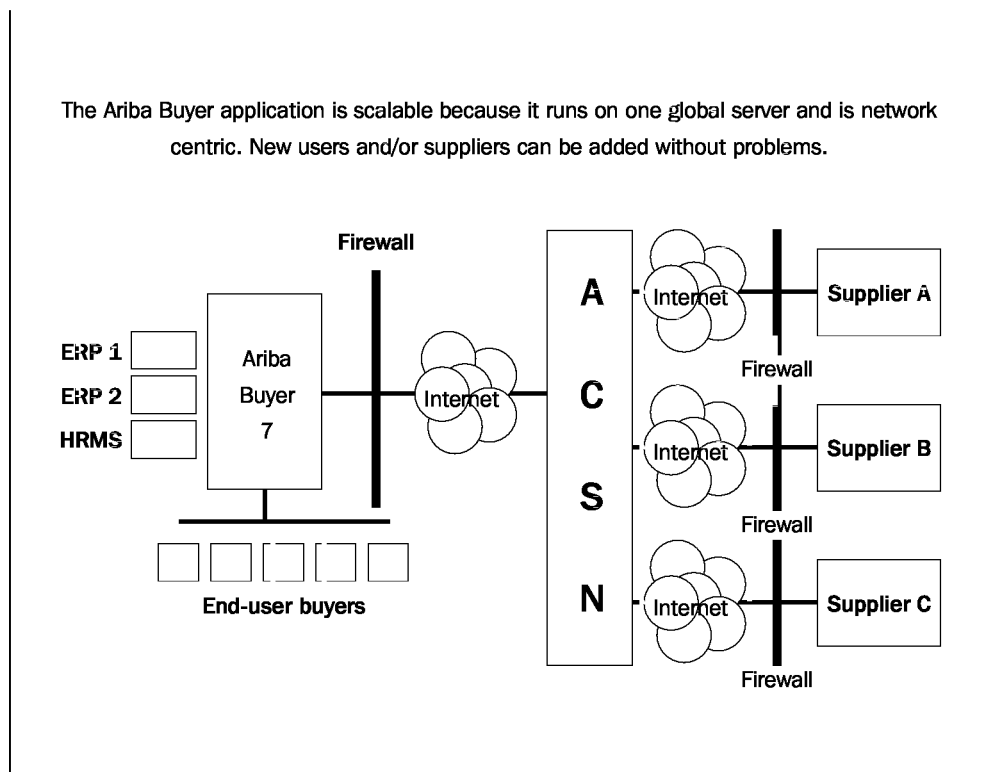


Strategically e-procurement complements Unilever's overall e-initiatives. Learning from these and the strategic sourcing expertise gained during implementation will improve business ability for the future e-procurement of both NPI and direct materials. Workflow automation and simplification of global sourcing processes will result in increased productivity and reduction of transaction costs. Data made available can then be applied to harmonize items purchased, rationalize needs with suppliers, and monitor and reduce usage, thus further increasing Unilever's buying opportunities.

*Selection and implementation of Ariba software*

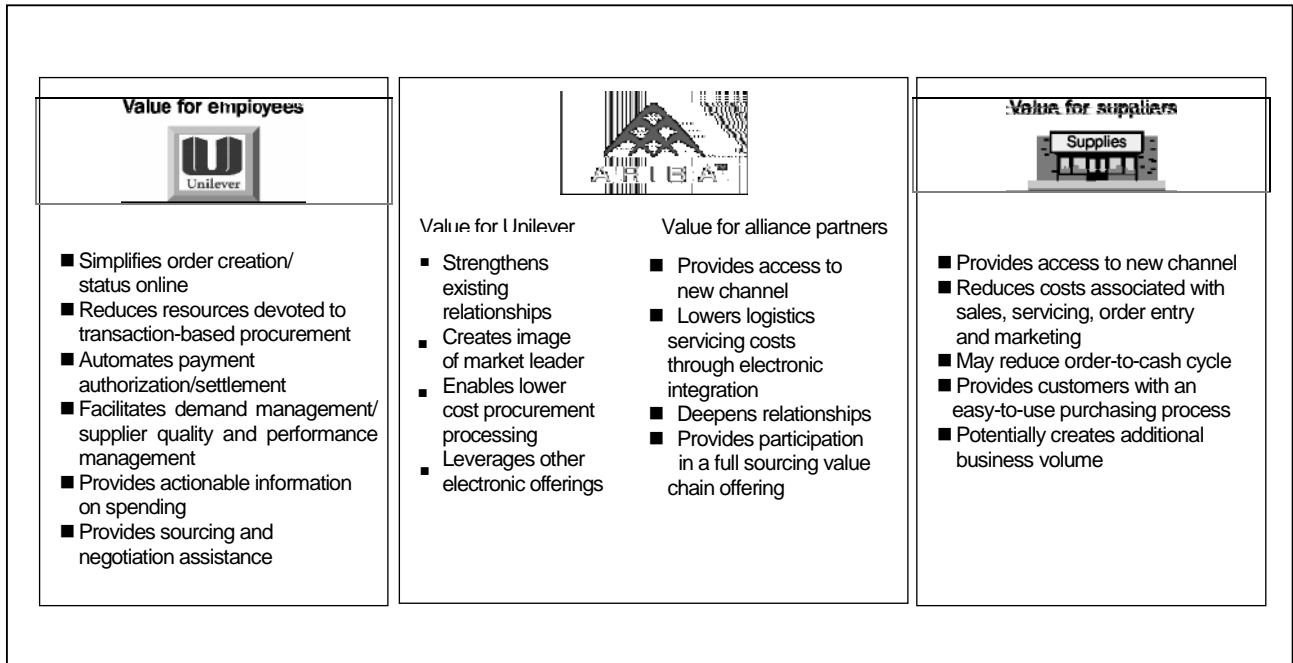
Unilever selected the Ariba Buyer software for e-procurement following a rigorous selection process and initial pilot in North America. Through Ariba, Unilever hopes to achieve cost savings, scalability and integration benefits (see Figure 10.4).

**Figure 10.4 | Unilever - one global installation**



However, of equal importance is the achievement of benefits to all the key players (see Figures 10.5 and 10.6).

**Fig. 10.5** Unilever – supply chain benefits



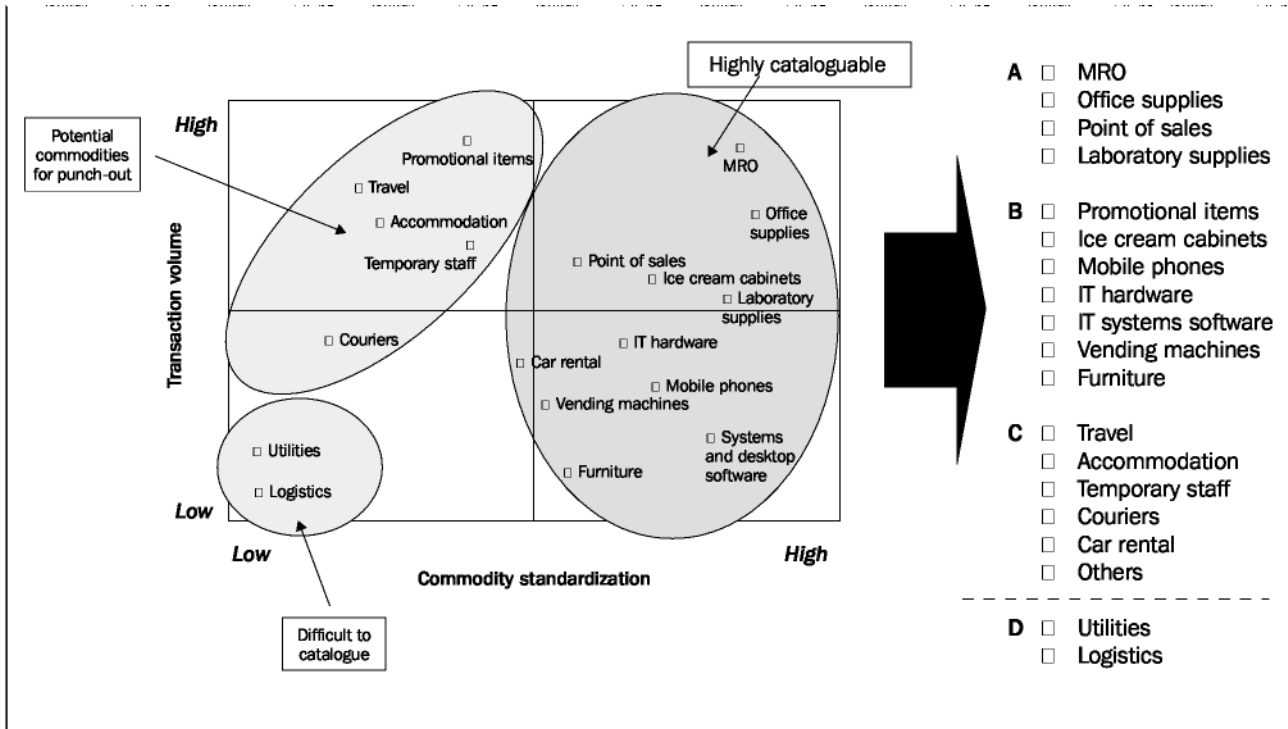
**Fig. 10.6** Unilever – Ariba CSN benefits

<p>Catalogue distribution</p> <p>Suppliers leverage catalogues by making them available to a large pool of buyers. It is a cost-effective method of providing catalogue access to a wide audience.</p>	<p>Automatic purchase order routing</p> <p>Ariba Network automatically routes purchase orders to the supplier's preferred ordering method.</p>
<p>Greater transaction volume</p> <p>As the single purchasing system, contracts will be leveraged to a much greater degree.</p>	<p>Order status tracking</p> <p>Customers can track order status on Ariba Network with periodic updates from the supplier. It provides real-time status of each order, which increases confidence.</p>
<p>Catalogue pre-validation</p> <p>Ariba Network automatically validates the format and syntax of the catalogue files and alerts the supplier so that errors can be fixed.</p>	<p>Business automation</p> <p>Automating the purchase-order and change-order receiving process leads to cost reductions. It eliminates unnecessary steps and processing of manual transactions.</p>

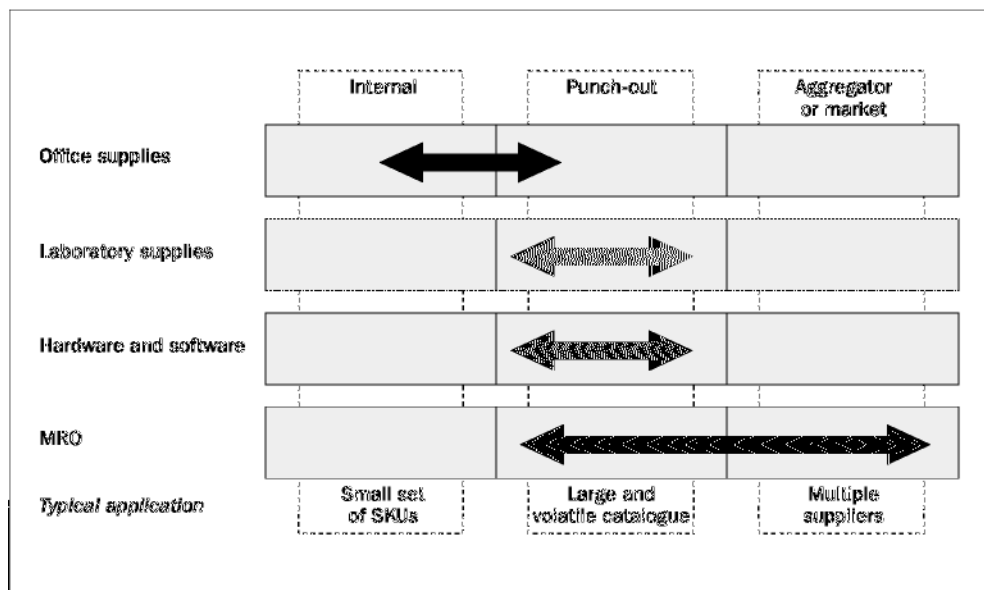


Following the successful pilot, which involved a range of categories and suppliers with training for around 200 users, Unilever decided in early 2001 to commence the rolling out of Ariba across its two largest markets, Europe and North America. This is expected to take at least three years by the end of which at least 30 per cent of total NPI spend should be via e-procurement (see Figure 10.7 and 10.8).

**Fig. 10.7** Unilever – applicability for e-procurement implementation



**Fig. 10.8** Unilever – sample use of catalogue types



### E-invoicing and e-payments

In addition to the procure-to-receipt process, reconciliation will also be undertaken leading to e-invoicing (see Figures 10.9 and 10.10).

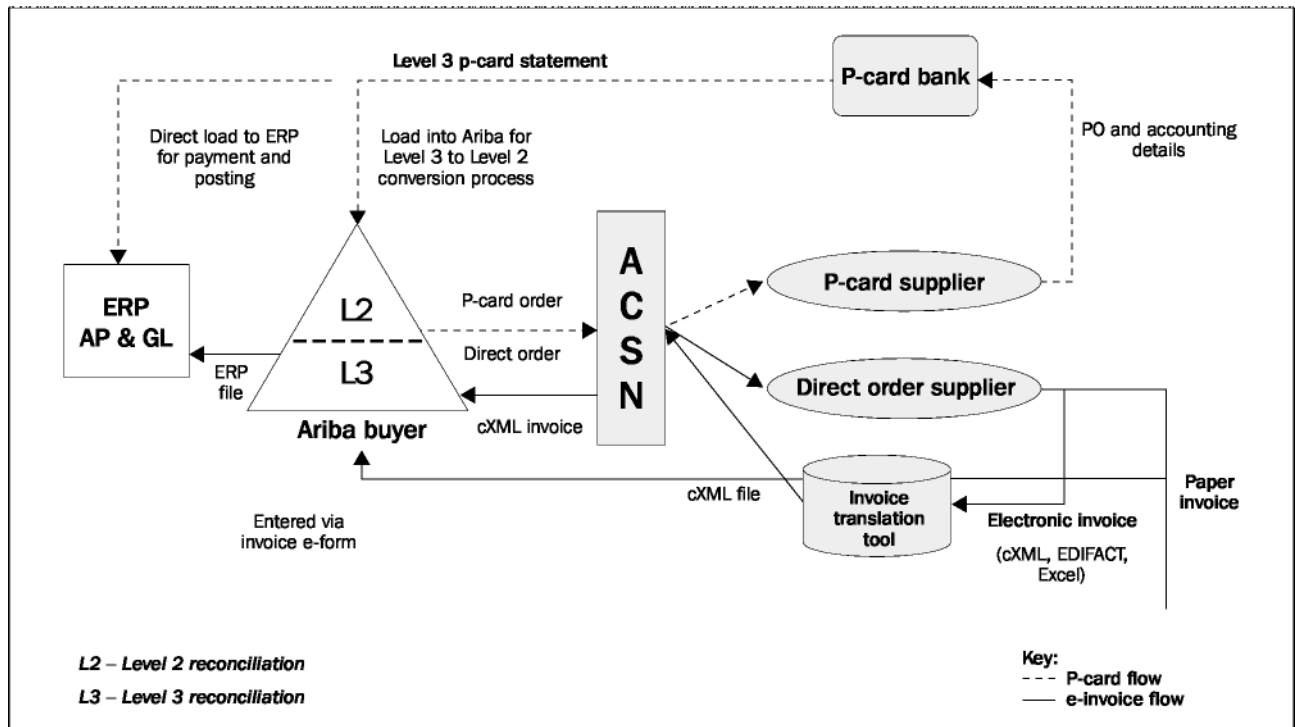
**Fig. 10.9** Unilever – e-payments overview of benefits

- What do we mean by e-payments?
  - Use of *purchasing cards* (p-cards) as a means of payment and invoicing
  - Use of *electronic invoicing* (e-invoicing), i.e. 'issuing' of invoices in any electronic medium, e.g. e-mail, EDI, cXML
- What are our objectives?
  - Increased process efficiencies and savings due to less manual intervention
  - Reduction in the flow of paper around the organization
  - Ability to reconcile all purchases, receipts and invoices automatically
  - Improved payment capabilities and supplier relations, i.e. ability to leverage supplier discounts due to prompt payments
  - Integration with Ariba e-procurement to provide a complete procure-to-pay process

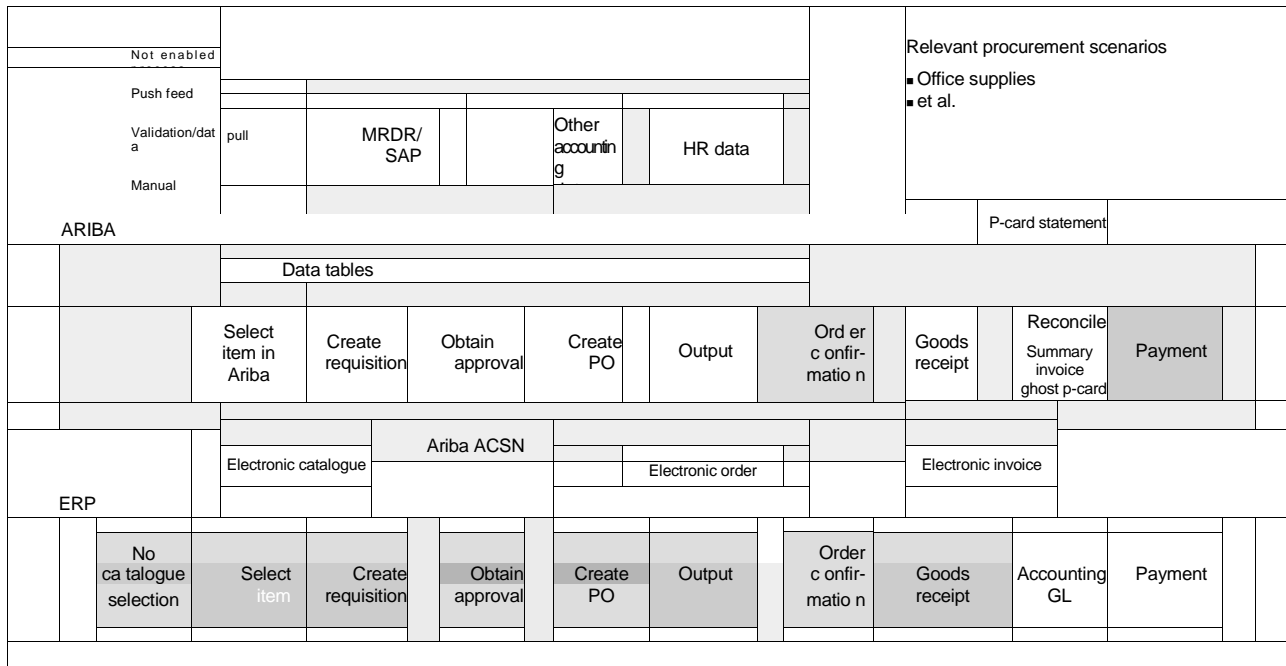
Long-term goal

*To have a completely electronic and paperless invoicing and archiving process across Europe (and rest of world)*

**Fig. 10.10** Unilever – e-payments process flow

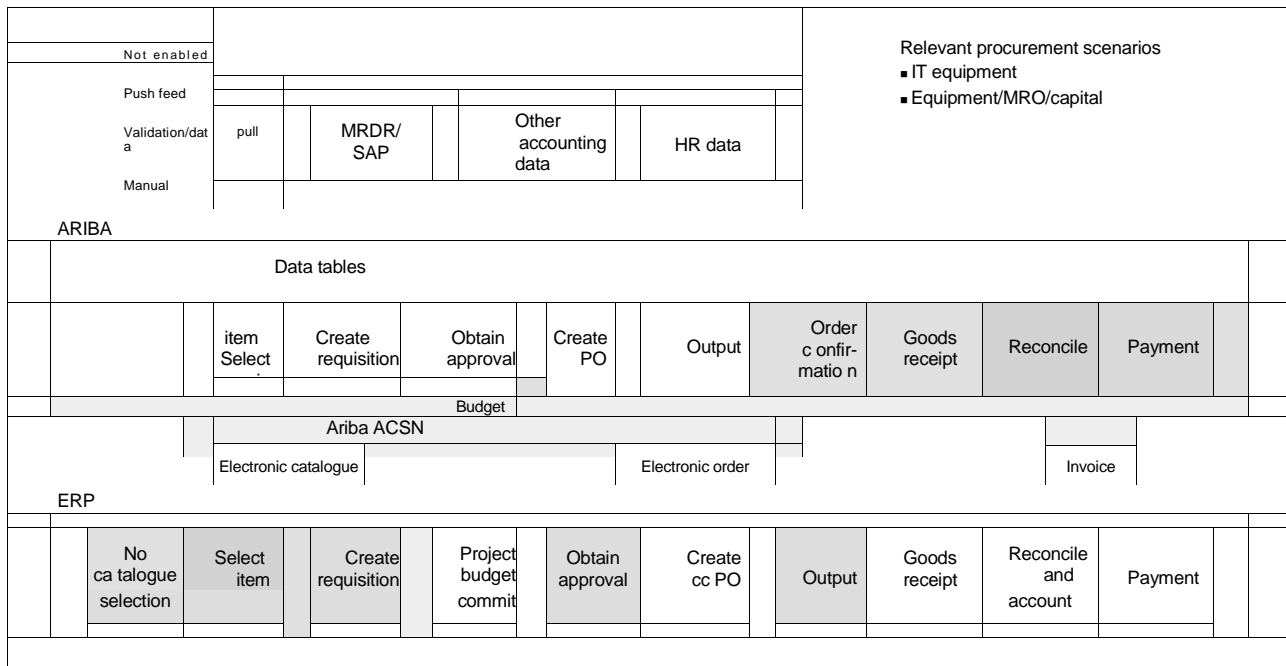


**Fig. 10.11** Unilever – catalogue items with e-payment flow chart



ERP integration will ensure a seamless E2E process for purchasing capital and impress items as well as the direct input of employee and cost centre information enabling rapid user uptake (see Figures 10.11 and 10.12).

**Fig. 10.12** Unilever – commitment buy with ERP reconciliation



In North America a Competence Centre (GACE: Global Ariba Centre of Excellence) has been set up to deliver consistent implementation through the application of a common toolkit and methodology. Within Europe an Ariba Academy concept has been introduced to provide multiple site implementations and the facilitation of training (including web-based training) and post-implementation support.

*Components critical for project success*

Although initial success has been achieved Unilever believes that these are still early days and that the return on investment has still to be proven. While e-procurement is an inevitability for future supply chain optimization the supply market, particularly in Europe, is still suffering from underdevelopment. There is an emerging recognition that e-procurement can affect total supply chain operation rather than just transactional activity. Until recently few have taken action to implement or sponsor the necessary changes. Encouragingly, however, Unilever believes that this position is changing and unquestionably e-procurement provides a catalyst for positive improvement in supply management profile.

Getting started with e-procurement requires five components to be in place that are critical to project success:

- The project must be set up for success as a procurement change management project and not as an exercise in implementing a new software solution.
  - There must be a clearly defined, realistic and compelling business case.
  - High-level sponsorship is required within the organization.
  - The resources and capability to get started and then to sustain the project must be available.
  - An effective progress monitoring system and agreed, relevant key performance indicators (KPIs) must be set up.
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# Customer relationship management and e-marketing

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- Customer relationship management 1 3 3
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- Pointers to CRM success 1 4 0
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## INTRODUCTION

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Customer relationship management (CRM) is about transforming an organization to become customer-centric and customer-facing in all that it does. Front-office systems are fundamentally different to the disciplined, process-based back office in terms of how information is tracked and its user base. It is about a change in culture that switches the emphasis of, for example, fulfilment from looking inwardly at what suits manufacturing and the supply chain to satisfying the company's external promises about service and delivery.

Successful CRM is about giving the customer a better experience, hence enhancing the company's chances of retaining the lifetime value of that customer and acquiring new customers. Internet grocery sales to shoppers, who had been using their favourite sites for more than three years were 75 per cent higher than sales to new shoppers. Where CRM is linked to powerful analysis tools it provides the ability to monitor and understand customer activity to a far greater depth than previously possible, enabling a quick reaction to changes in markets and a consistent high standard of customer service.

In theory, the Web is the best friend a CRM manager ever had. Internally, it is the ideal tool to tie together the disparate, product-based systems that contain customer data. Externally, it can provide all customers with a similar and consistent experience, whatever products they buy. Integration of CRM with ERP and SCM is critical to success, especially supporting systems such as order fulfilment, logistics, inventory management and EBPP. The aim is to give the customer a seamless experience. The goal of integrated CRM is to understand who the most profitable customers are – essential for online and offline business success.

## CUSTOMER RELATIONSHIP MANAGEMENT

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The growth of spam, i.e. unsolicited mail, banner adverts and other unwanted messages from retailers known as interruption marketing, has grown to such a level that the messages have become ineffective from the point of view of successfully reaching the potential customer. Permission marketing is seen as the answer to this problem. Permission marketing is about seeking agreement from customers to be involved in marketing activities. The process of persuading the customer to 'opt-in' is usually successful when an incentive is offered, e.g. in B2B it could be a report and in B2C it may be a screensaver. Payment for viewing advertisements has even been seen. The process of offering incentives usually continues through the relationship. It is this concept that has led to the growth in CRM.

The process can be split into three stages as discussed below and involves both online and offline techniques.<sup>1</sup>

## Customer acquisition

There is a range of techniques to attract people to use e-commerce services, either as new customers or as converts from more traditional channels. For example, American Express developed its 'Go Paperless' campaign to persuade customers to receive and review their statements online.

### *Marketing communications*

#### *Online:*

- *Search engines and directories* – the important factor here is the use of metatags on the site, which are key words that the search engines look for.
- *Building links* – for example, reciprocal, PR content, affiliate networks, sponsorship.
- *Viral marketing* – a method of reaching people in the same way as viruses – by being passed on by a friend.
- *Banner advertising* – appearing on other sites which, when clicked, transport the potential customer to the advertiser's site.
- *Cookies* – small text files stored on an end-user's computer to enable websites to identify them – tagging.

#### *Offline:*

- *Print* – catalogues, point of sale, direct mail, magazines, newspapers.
- *TV and radio*.
- *PR and word of mouth* – trade shows, sponsorship.

### *Customer profile*

Once attracted to the site, it is then necessary to build up information about the customer regarding such details as product interest and demographics to facilitate segmentation and potential profitability.

## Customer retention

Since satisfaction drives loyalty and loyalty drives profitability then once acquired it is necessary to work on retaining the customer.

### *Personalization and mass customization*

Personalization refers to the customizing of information requested by a customer at an individual level while mass customization is the same process aimed at a group of customers with the same interests. This is one area where technology

enables communications of this type to be targeted and effective. The method and frequency of delivery are also important even to the opted-in customer.

### *Localization<sup>2</sup>*

According to *eMarketeer*, at the end of 1999, 96 per cent of all e-commerce sites were written in English, while linguists report that just 6 per cent of the planet's inhabitants speak English. According to Forrester Research, eyeball time is doubled on sites localized for language and culture.<sup>3</sup> Japanese businessmen, for example, are three times more likely to conduct an online transaction when addressed in Japanese. By 2003, the majority of web content will be in a language other than English, mainly Chinese. To maximize global revenues and grow earnings, e-commerce companies must address target markets in the local language and with localized content. Forrester's Eric Schmitt says:

*When offered in multiple languages, customer-service features like product data sheets and FAQs provide differentiation, build brand loyalty, and cut support costs.*

To help generate cross-border revenues, companies are using localization outsourcers such as Interwoven, Berlitz GlobalNET and Lionbridge Technologies. As well as translation services these companies assist in providing brand protection, and offer advice on design and cultural aspects, and legal and regulatory snares, e.g. in France consumers enjoy a one-week grace period after purchase, in Germany comparative advertising is banned and in China encrypted websites are regulated by the government.

### *Online communities*

This is the setting up of C2C communities to enable interaction via e-mail groups (e-groups), or web-based discussion forums or chat rooms. These can be aimed at:

- a particular purpose, e.g. looking for a holiday;
- people's circumstances, e.g. state of health, age;
- a particular interest or hobby, e.g. music or sport;
- a particular profession, e.g. accountancy.

What you do not want to do is to build up empty, silent or critical communities as they would have a negative effect.

### *Service quality*

Not surprisingly, research shows that quality of service is a key determinant of customer loyalty. Service quality is judged on:<sup>4</sup>

- *tangibles* – physical appearance and visual appeal;
  - *reliability* – consistency and accuracy;
  - *responsiveness* – willingness to help and provision of prompt service;
  - *assurance* – knowledge and courtesy of employees and ability to convey trust and confidence;
- 
- *empathy* – caring individual attention.

### Customer extension

Customer extension is about deepening the customer relationship through increased interaction and broadening of product transactions. The aim is to increase the revenues generated by each customer known as lifetime value. Targeted cross-selling of other company, possibly new, products can be done during a website visit or via e-mail promotions.

## CRM AUTOMATION

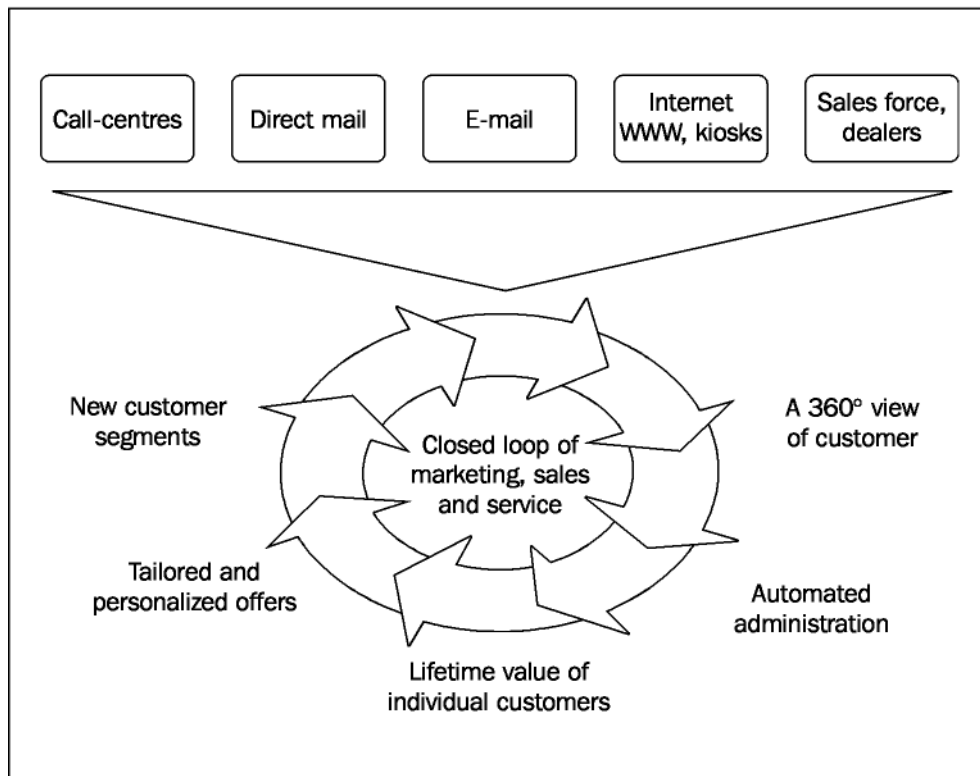
The application of technology to achieve CRM is a key element of any e-business. It was the failure to retain customers and make money from them after having spent large sums on acquiring them that resulted in the recent [dot.com](#) collapses. CRM applications cover three broad categories: marketing automation, sales process automation (contact management) and customer service automation. The solution can be the integration of fragmented individual applications for parts of the process, which already exist in most organizations. The ideal would be a comprehensive suite covering the whole spectrum that provides interaction between employees and customers across multiple channels with all customer information stored in a single database to provide total visibility (*see* Figure 11.1).

The main specialist software suppliers include Siebel, Vantive (now linked to Peoplesoft), Clarify (now linked to SAP) and Sage with Interact in the SME marketplace.

### Marketing automation

Marketing campaign management, customer segmentation, product mix management, targeted intelligent web content and personalization, e.g. tools like Broadvision's One-to-One Enterprise, create a persistent record of someone who visits the commerce site so that intelligence about an individual's preferences can be built up over time.

Fig. 11.1.1 | CRM: a platform for successful marketing



### Case study 11.1

#### More Th>n

More Th>n<sup>5</sup> was launched by Royal & Sun Alliance after 18 months in planning and an investment of £20 million in customer and IT systems. As well as acquiring 400,000 new customers a year it needed to serve R&SA's 2 million existing customers, through knowledge provided from existing databases. The main concern focused on the integration of two R&SA databases – one bespoke operations database held personal details and the other Indentex marketing database held demographic data and predictive analytics. The new Indentex marketing database, the London Bridge call-centre software and the ValEx campaign management tools are interrogated by SAS's Enterprise Miner heavy-duty analytics tool. More Th>n believes the key to success is in having commitment from the highest level.

### Sales process automation

This includes new business prospecting, direct sales force automation, enquiry handling, order taking and processing (back-office ERP), after-sales support, development selling, forecasting and analytics.

### Case study 11.2

#### Consignia

Consignia's<sup>6</sup> CRM project, termed Spice (Securing the Post Office's Integrated Commercial Environment), is part of a £200 million investment in improving services to its 28 million customers and the 19,000 branches that make it Europe's largest retailer. It has three phases:

- redesigning Consignia's customer-facing processes;
- introducing a standard software infrastructure to support these processes;
- deploying them into 14 BUs.

The objective is to give customers the same experience of Consignia through each of its channels – Web, phone and high street – and through all its brands including Post Office Counters, Royal Mail and Parcelforce. Previously, their 130 legacy systems were oriented around its brands. It plans to have 4,000 staff using Siebel's CRM software by April 2002. Three tips from Jean Irvine, Spice programme director, are:

- First choose a flexible software application.
  - Be ready to learn from your experiences and build change management into the project from the start.
  - Remember that IT is there to support the business, not the other way around.
- 

### Customer service automation

This includes call-centres, the Internet, help-desks, CTI and telesales. Good call-centres are crucial to many modern organizations' success and well trained and motivated staff are as important as the latest technology.

### Case study 11.3

#### Sky Services

Sky Services<sup>7</sup> have revamped their call-centre based on Chordiant's V.2 CRM solution. BSkyB employs 8,000 people across its sites in Livingston and Dunfermline, with 4,500 in call-centres. With more than 5 million direct customers, 70,000 new installations and 1 million calls a week, interaction between the call-centres and customers is recognized as being critical to their success. MD Mike Hughes says:

*One of the business challenges we had when I started was it was very difficult to introduce a new product or service – it took 90 days on average.*

The Java-based thin client PCs link into a range of back-office legacy systems, bespoke applications and Chordiant. A key part of the strategy is 'object re-use', which means honing existing technologies and skills and making the most of rather than replacing them. The plan

is to also equip their 2,800 field engineers with handheld devices, which link into the CRM solution, to give them access to the same desktop information as centre-based agents.

Training is a big part of Hughes' plans. A mock living room has been created for customer scenarios and role playing, and for finding other ways to help agents deal with queries more efficiently. Hughes explained:

*With large call centres you're able to programme people to do things. But if we select people with the right level of competency, and they have the right tools, then why not let them inject a bit of personality? This is empowerment with structure. The trick is getting the pace right in terms of implementing change.*

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#### **Case study 11.4**

##### The AA

The AA, working in partnership with BT, provides switching technology for virtual call-centres, with operators working from home still able to direct mobile mechanics to breakdown sites.

#### **Case study 11.5**

##### Commerzbank

Commerzbank<sup>8</sup> is implementing a Siebel CRM system to replace its Goldmine help-desk package with help from consultants Headstrong. They have replaced a system that covered just equities with a global system covering all sales desks. It is in two stages: the first links Siebel's front-end CRM package to back-end systems, including the bank's online trading systems and a Broadvision web-based publishing system. Stage two will add a range of Siebel analytics tools.

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## KEY BENEFITS OF CRM<sup>9</sup>

CRM:

- provides a single point of access to information for sales, marketing and customer service;
- supports better-informed business decisions by providing a single enterprisewide view of the customer;
- enables real-time interactions between customers, employees, partners and the enterprise;
- integrates and personalizes the delivery of customer services;



- improves the customer experience through whatever point of contact is chosen;
- the influences of the Internet as a self-service delivery channel.

## POINTERS TO CRM SUCCESS

Implementing the technology is, in many ways, the easy part. The difficulty comes in establishing a business strategy and organizational structure that will support and accommodate this new technology and break down the cultural barriers to change. Organizations face an uphill struggle to ensure their CRM processes are as sophisticated and diverse as those of their competitors, often requiring the adoption of more channels of communication. It is essential to avoid the trap of trying to do everything at once without effective coordination and neglecting to take a broad view of how an initiative will affect the entire organization. It is important that businesses take a far-sighted, strategic approach to CRM, realizing that the long-term ROI will not be made overnight.

Cambridge Technology Partners offer the following pointers to CRM success:<sup>10</sup>

- *Don't get complacent.* Conduct frequent reviews of success, taking both external changes and internal adoption into account. Exceeding customer expectations demands continuous improvement.
- *You're not on your own.* Realize that everyone is doing it. Every organization needs to execute CRM initiatives in different ways and with different goals to deliver competitive advantage. One size does not fit all.
- *Don't underestimate the power of the customer.* Consider that customers are more demanding than ever and show no signs of relenting. They expect a consistent level of service and treatment; ignorance is no excuse. Each channel must enhance, rather than detract from, the experience the customer receives, and that means consistent data, service and results.
- *Analyse data.* Use data analytical tools to help you focus on high-value customers and treat them as your most important assets. This in turn must lead to meaningful customer segmentation.
- *Choose your channels wisely.* Perform careful analysis to ensure that effort and cost is not expended on a channel that will only be infrequently used by your customer base. The ultimate goal is to tactically drive customers to specific channels, taking into account which are most cost effective, e.g. Easyjet only deals over the Web.
- *Be consistent.* Ensure that a consistent brand message, look, feel and service are provided to customers across all channels.

- *Avoid silos.* At any given point a customer service representative needs to have a complete historical view of all channels used by the customer.
- *Evaluate.* Implement ongoing evaluation to measure results and allow for continual adoption of necessary changes.
- *Don't forget the human element.* Bring people into the process. Give incentives to deliver excellence to customers to ensure their buy-in to the process.

## E-MARKETING

Marketing is the management process responsible for identifying, anticipating and satisfying customer requirements profitably. A framework known as SOSTAC<sup>TM11</sup> that summarizes the different stages that should be involved in an e-marketing strategy is described below.<sup>12</sup>

### Situation analysis

#### *Internal audits*

- Current Internet marketing audit (business, marketing and Internet marketing effectiveness).
- Audience composition and characteristics.
- Reach of website, contribution to sales and profitability.
- Suitability of resources to deliver online services in face of competition.

#### *External audits*

- Macro-economic environment (social, legal, political, economic and technological characteristics).
- Micro environment (new marketplace structures, predicted customer activity).
- Competition (threats from existing rivals, new services, new companies and intermediaries).

### *SWOT analysis*

- Market and product positioning.
- Methods of creation of digital value and detailed statement of customer value proposition.
- Marketplace positioning (buyer, seller and independent marketplaces).
- Scope of marketing functions.

## Objectives statement

- Corporate objectives of online marketing (mission statement).
- Detailed objectives: tangible and intangible benefits, specific critical success factors.
- Contribution of online marketing to promotional and sales activities.
- Online value proposition.

## Strategy definition

- Investment and commitment to online channels (mixture of bricks and clicks).
- Market and product positioning (aims for increasing reach, new digital products and new business and revenue models).
- Target market strategies (statement of prioritized segments, new segments, online value proposition and differential advantage. Significance of non-customer audiences? )
- Change management strategy (which new processes, structures and responsibilities will be required).

## Tactics

- Product (creating new core and extended value for customers, options for migrating brand online).
- Promotion (specify balance of online and offline promotion methods, CRM).
- Price.
- Place (marketplaces).
- People, processes and physical evidence – service delivery.

## Action

- Project plan and implementation.
- Team organization and responsibilities.
- Development and maintenance process.

## Control

### *Identify a measurement process and metrics*

Financial service organizations, particularly the banks, have been leading the way in customer analytics to support point or tactical marketing and CRM. It is

essential that this analysis becomes strategic. According to Gartner, by 2005, 30 per cent will effectively leverage a holistic understanding of the customer during customer interactions and, as a result, will outperform competitors in terms of profitability, share of wallet and retention of key clients.<sup>13</sup>

Analytics used include:

■ customer segmentation	-	100%
■ predictive modelling	--	83%
■ customer profitability analysis	-	76%
■ lifetime value	-	47%
■ event monitoring/triggering	...	<u>30%</u>

### Case study 11.6

#### Lloyds TSB

Lloyds TSB<sup>14</sup>

used CRM analytics to strengthen customer loyalty and deliver a positive customer experience consistently and cost effectively in the aftermath of a merger. They knew that 16 per cent of its 15 million customers generated 80 per cent of their profit and that a further 30 per cent were new or inactive. The pilot project known as Caribou had the objective of testing the power and feasibility of leveraging customer information to improve the quality and value of customer relationships. Specifically, it focused on the effectiveness of direct marketing-led campaigns as a way of improving cross-selling, up-selling and retention and reducing the cost of sales. Assisted by AMS, the project showed them how to engage the business across the organization and how to refocus teams drawn from many different areas from a purely product-focus towards a customer-centric approach.

### Case study 11.7

#### Convergys

Convergys<sup>15</sup> is a US-based outsourcer of customer service and billing. Convergys is one of many B2B specialists which are turning to an old standby, lifetime customer valuation (LCV), to help get a fix on which customers offer the greatest profit potential. The goal of LCV is to separate truly profitable clients from the barely profitable and allocate resources accordingly. First used in the 1930s the metric assessed the NPV of a customer's future spending. Convergys rolled out an LCV programme a few years ago and in 2001 saw its reported operating income up 16 per cent – a large percentage coming from winning new business from old customers. According to the CFO, the lifetime value modelling index is an empirical validation of Convergys' own instinctive belief that there is potential to grow existing client relationships significantly. The LCV rating system used by Convergys factors in non-revenue items for a more accurate picture of the reliability of customer spending.

Their weighted index included:

- Average revenue score (15%) – based on current and projected spending
- Revenue change score (15%) – based on actual year-to-year spending
- Profitability score (20%) – based on customer contribution margin
- Current relationship (10%) – based on signed contract length and total years as client
- Share of client (10%) – based on outsource potential
- Partnership (10%) – based on level of contact, referenceable and future value
- Technology entanglement (20%) – based on system integration, reporting, e-mail, Convergys' web agent assisted service

Technology entanglement, which makes up 20 per cent of the index, measures IT integration between Convergys and its customers. The more entangled, the more it would cost to switch to a competitor. It has completely changed the way staff view customers – one low-volume customer ranked 62nd in sales came 3rd on the LCV index, while another 5th in current spending dropped to 13th on LCV scores.

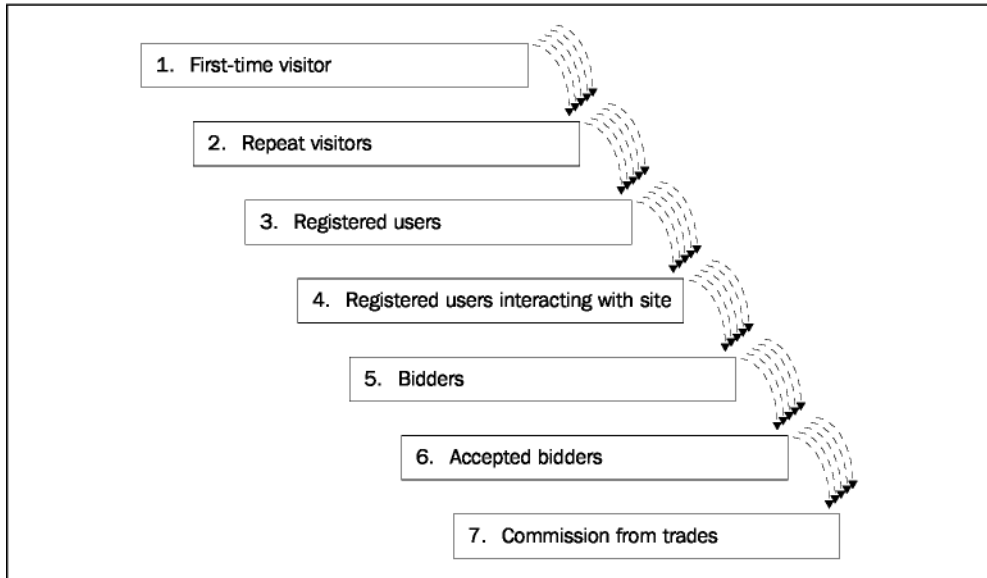
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The subject of measurement process and metrics is covered in detail in *Transforming the Finance Function*,<sup>16</sup> which covers the balanced scorecard, website and CRM analytics and customer valuation.

### Case study 11.8

#### ProXchange

See Figure 11.2 which illustrates ProXchange's seven-level waterfall, taken from this companion briefing.



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# How to Analyse, Re-engineer and Manage Business Processes

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# Business process analysis

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## INTRODUCTION

All process/activity-based techniques (P/ABT) involve analysing the business to gain a greater knowledge of what activities it performs and how those activities relate to one another. A series of activities that flow from one to another constitutes a process. In other words, this analysis helps us understand how the business operates. This process-based analysis then forms the central database, which can be utilized by one or all of the numerous P/ABT that an organization decides to use to improve and manage its business.

P/ABT fall into three broad categories:

- *Costing/pricing/profitability:*
  - activity-based costing
  - product/service costing
  - product/service pricing
  - market/channel/sector and customer profitability
  - transfer pricing including inter business unit (BU) pricing.
- *Performance improvement:*
  - process and activity mapping
  - cost reduction
  - value analysis
  - –constraint removal
    - business process re-engineering (BPR)
    - benchmarking
    - best value
      - integrated E2E processes.
- *Ongoing performance management:*
  - value-based management
  - performance measurement/management
  - service-level evaluation
  - activity-based budgeting (ABB)
  - priority-based budgeting (PBB)
  - resource accounting and budgeting (public sector)
  - benchmarking
  - best value (public sector)
  - Six Sigma
  - process-based accounting
  - integrated E2E processes.

The use of these techniques now transcends every industry sector. The beauty of P/ABT lies in their simplicity which allows them to be understood by anyone at any level in the organization, and their universal application to anything that consumes resources.

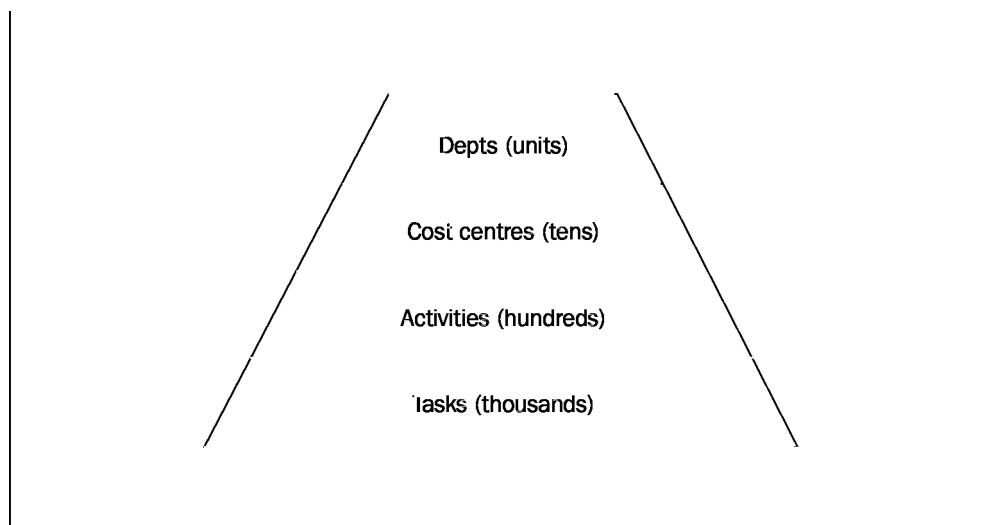
A CIMA Research publication, *Activity-Based Techniques – Real-Life Consequences*,<sup>1</sup> examined 11 companies that had been using P/ABT for a number of years and found, among other things, that:

- although the businesses had typically embarked on the use of one P/ABT initially, often ABC for product costing or BPR for performance improvement, they went on to use an average of three techniques, usually including activitybased budgeting for management and control;
- implementation of P/ABT made a contribution to changing culture and improving relations between the functions, particularly finance and operational departments. Noticeably, this had been assisted by such factors as the common language of P/ABT to discuss costs and performance with any member of the organization.

## ACTIVITY/PROCESS ANALYSIS METHODOLOGY

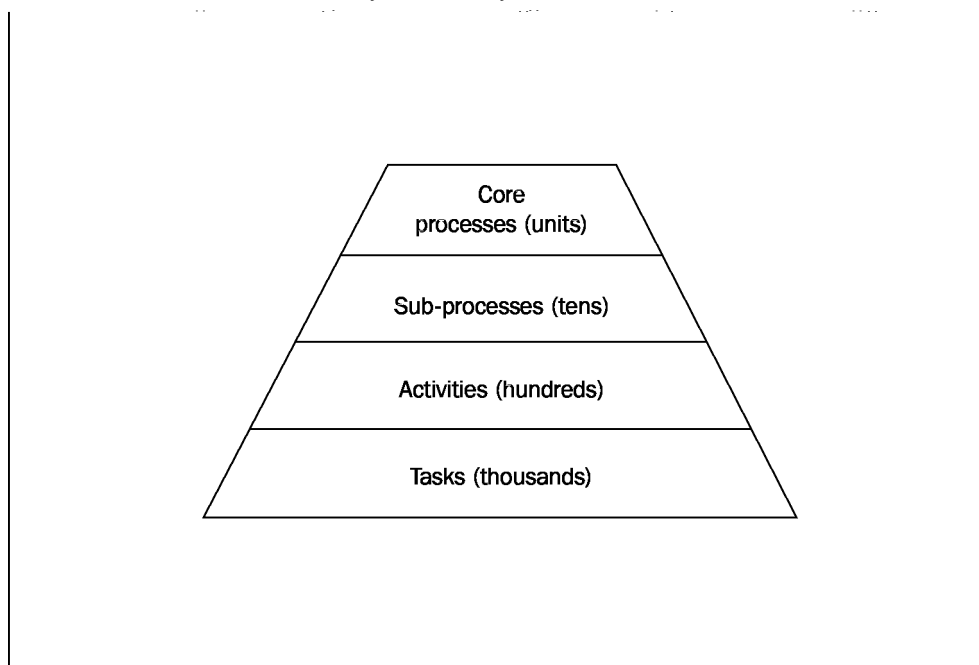
When carrying out process/activity analysis for the first time, it is generally easiest to use the company's organizational structure, as shown in Figure 12.1. The starting point is to ask a representative from each budget or cost centre within your organization's structure of departments, directorates, functions or business units to analyse the activities that they perform and, depending on the detail required for the purpose, the tasks within those activities.

**Fig. 12.1** Organization structure hierarchy



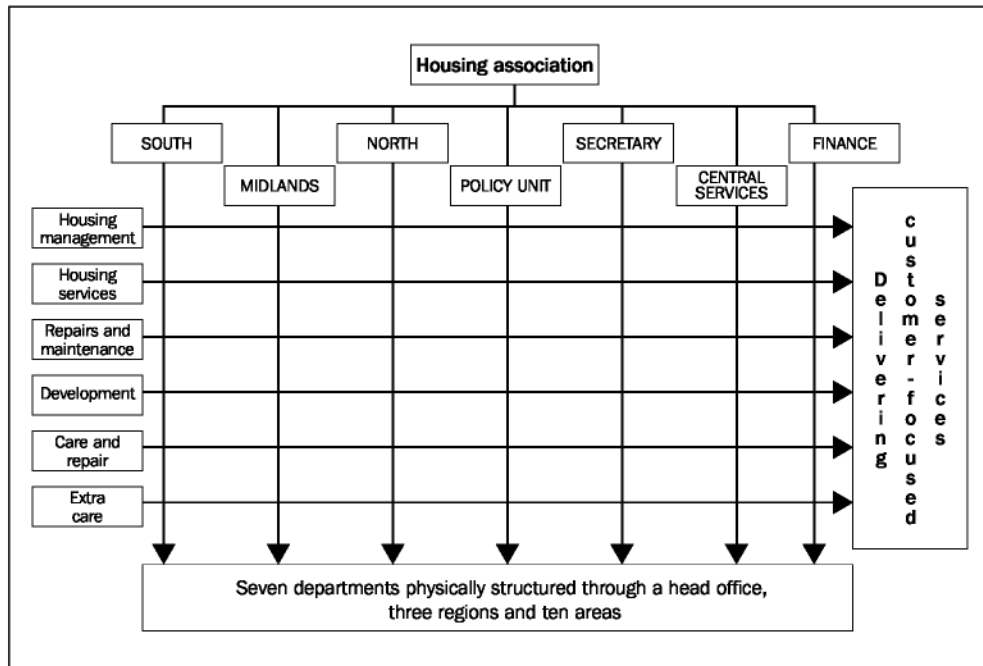
Then, as can be seen in Figure 12.2, the tasks and activities can be grouped into activity flows forming sub-processes, which in turn can be related to the core processes of the business. The core processes are those that define the purpose of the organization's existence, the processes that deliver the products or services that the company is in business to provide. All activities and sub-processes carried out within the company must contribute towards these core processes in some way. The analysis carried out makes this relationship clear and provides an understanding of how the business operates. Obviously, in an actual analysis the number of levels in the hierarchy varies considerably, depending on the size of organization and the level of detail required, to achieve the defined objectives.

**Fig. 12.2** Process/activity hierarchy



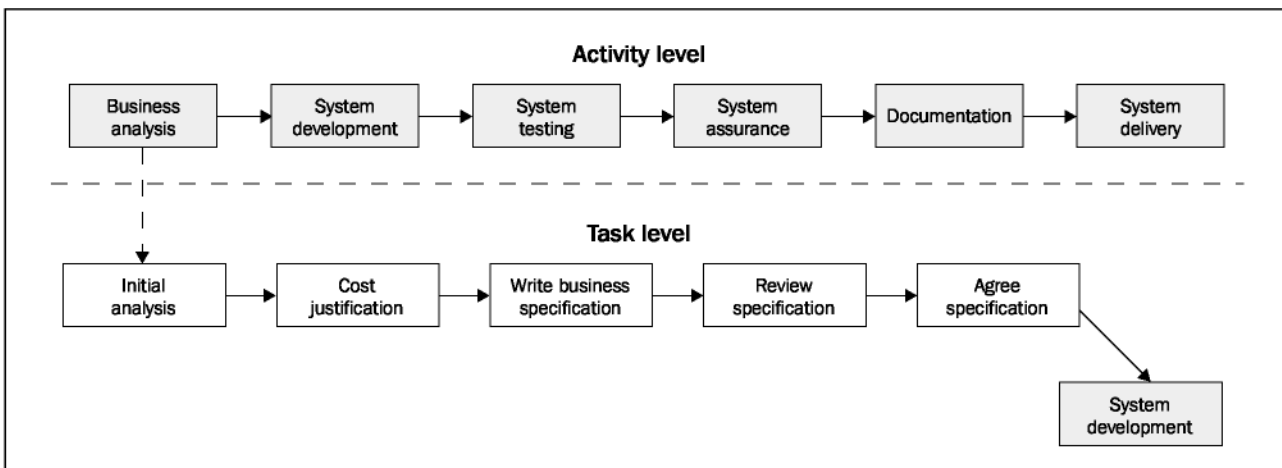
In Figure 12.3 the organizational structure of a housing association can be seen going down the page and the core processes going across the page, cutting each other in a cross named after CAM-I, the research organization that first defined it.<sup>2</sup> This represents how all the departments within the organizational structure each contribute to the core processes via the sub-processes that they perform. Processes represent a series of activities, which produce a specified output and ignore all functional boundaries. The hierarchy, which shows their interrelationships and the contribution that they make to the end product or service is represented by the pyramid in Figure 12.2.

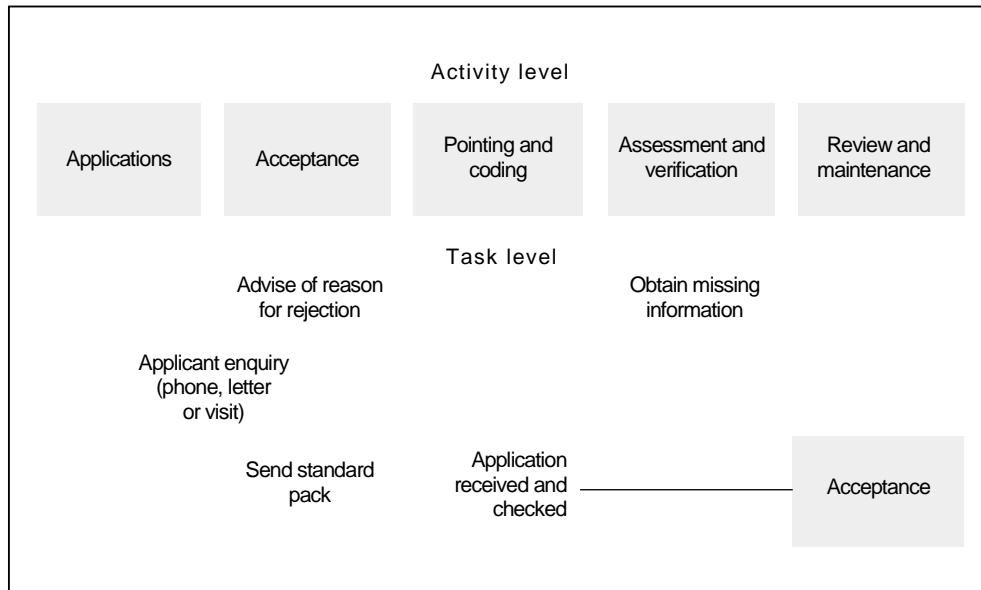
**Fig. 12.3** CAM-I cross



In Figure 12.4, the systems design and delivery sub-process can be seen as one of the sub-processes that contributes to the infrastructure, which in turn contributes to the core processes. It illustrates that the sub-process is made up of a flow of six activities, each of which in turn can be analysed into the flow of tasks that perform the activity. If required, each of the tasks could similarly be analysed into sub-tasks. All organizations are made up of a number of sub-processes, some of which are of a support nature and are common to most organizations, like procurement, recruitment and provision of management information. Others are specific to their industry sector, in the way that maintaining a waiting list (see Figure 12.5), reactive repairs, allocations and tenancy management are to housing associations.

**Fig. 12.4** Systems design and delivery sub-process



**Fig. 12.5** Waiting list sub-process

Tips when designing the model include the following:

- Determine the correct level of detail needed for the purpose, e.g. detailed information for performance improvement initiatives.
- Describe activities clearly and consistently, using an activity dictionary, e.g. keep descriptions short, activities should end in 'ing'.
- Keep it as simple as possible.
- Evaluate all requirements before building process models, e.g. short term may be BPR, but longer term E2E.
- Ensure that you build to the strengths of the software being used.

## COLLECTION OF ACTIVITY/PROCESS INFORMATION

Depending on the P/ABT that is being used, data needs to be collected, generally from the people carrying out the activities within each budget/cost centre or sub-process.

Information collected could include:

- activities and tasks performed;
- relationships to other activities/processes (flows);
- inputs and outputs to and from the activities/processes and their units of measure;
- resources consumed, e.g. time spent, amount of office space used (resource drivers);
- basis of allocation to products or services and customers (activity drivers);

- factors that influence the process/activity's performance (cost drivers);
- performance measures (financial and non-financial, quantitative and qualitative);
- activity/process objectives and responsibilities;
- activity classifications (core, diversionary, support);
- alternative service levels;
- ideas for improvement.

It is worth noting at this point that detailed time recording and analysis by all staff on an ongoing basis are not prerequisites to activity process analysis. This is a popular misconception that has no foundation in practical application.

### Methods of data collection

Many methods can be used for collecting data; generally, the initial analysis will be undertaken on the best data available and then specifically automated systems will be set up for ongoing monitoring.

Sources of existing data can usually be found in:

- timekeeping systems (for identifying resource drivers);
- corporate information systems (for activity drivers, outputs and non-financial performance measures);
- financial information systems (for costs, assets and budgets);
- HR systems (for payroll, people information and organizational structures);
- the department cost centre or process being analysed (activities, relationships, flows, cost drivers, inputs and outputs).

Methods of data collection include:

- observation;
- storyboards or group workshops used to brainstorm activity/process analysis (useful when trying to get a quick, first cut of information);
- downloading of information from other IT systems;
- interviews are a popular method but one that has the disadvantages of being time-consuming and dependent on instant responses from the interviewees, though ideal if one area only is being analysed;
- questionnaires/forms will need to be explained carefully to the people who are going to complete them, with support available for questions that arise. Select one representative from each cost centre to complete the questionnaire/forms



and train them in how to carry out the analysis, encouraging them to involve all the staff within their cost centre. A sample form designed for collecting basic activity and resource allocation data can be seen in Figure 12.6.

**Fig. 12.6** Data collection form

		Activities							
Cost centre code: HDK Cost centre name: Help Desk Completed by: Joan Ayres Date: 28.04.99		Handling routine enquiries Resolving problems Escalating problems Management							
Personnel									
Name	Emp. No	1	2	3	4	5	6	Fraction	
Ann Williams	12341	40	28	32				1.0	
Fred Smith	56782	35	25	40	10			1.0	
John Shore	90123	45	32	23				1.0	
Lynne Edwards	34514	55	20	25				1.0	
James Roberts	78905	60	25	15				1.0	
Peter Brook	1236	50	28	22				1.0	
Joan Ayres	45677	40	35	15	10			1.0	
Ron Jones	89018	0	30	20	50			1.0	
Consumables									
Code	Description	1	2	3	4	5	6	£k Budget	
C2200	General travel		30	30	40			6.0	
C3300	Office supplies	25	25	25	25			2.0	
C4450	Publications			50	50			1.5	
C3320	Photocopying		30	40	30			0.7	
C2260	Car allowance				100			4.5	
C4999	Internal purchases	25	25	25	25			20.0	
								34.7	

Once the data has been collected and analysed, always validate it by checking with the cost-centre staff and management to ensure that no errors have occurred during preparation. If the collection of data has involved the selection of choices, e.g. which methods of allocation to use, then it is advisable to hold a workshop of all interested parties and gain consensus on the 'preferred' methods.

## STEPS IN BUILDING A PROCESS MODEL

1. *Decide what the model is going to be used for.* As in all projects, clearly defined objectives are essential. Indicate the level of detail required in the activity hierarchy and the software features and functionality required – BPR and E2E is likely to require process mapping and detailed task-level information whereas ABC is likely to require the ability to carry out multidimensional allocations and sub-process and activity detail only. Beware too much detail.
2. *Make decisions regarding use of appropriate software.* This is covered in *Transforming the Finance Function*.<sup>3</sup>
3. *Design the structure of the model.* The methodology will vary with the choice of software and project objectives, but decisions need to be made at this stage, e.g. what are the products/services and customers/markets/channels to be analysed? Remember that because this is a model, the process analysis can be viewed from different perspectives.
4. *Collect the data.* See p. 152–3.
5. *Build the model on the chosen software and validate with users.* Remember that the model is going to be utilized for decision making throughout the organization and possibly by partner companies. It is important that all the users trust the information and, as such, need to be involved and consulted at every stage.
6. *Update, review and report regularly.*

### Case study 12.1

#### Anglian Water Services

##### *Background*

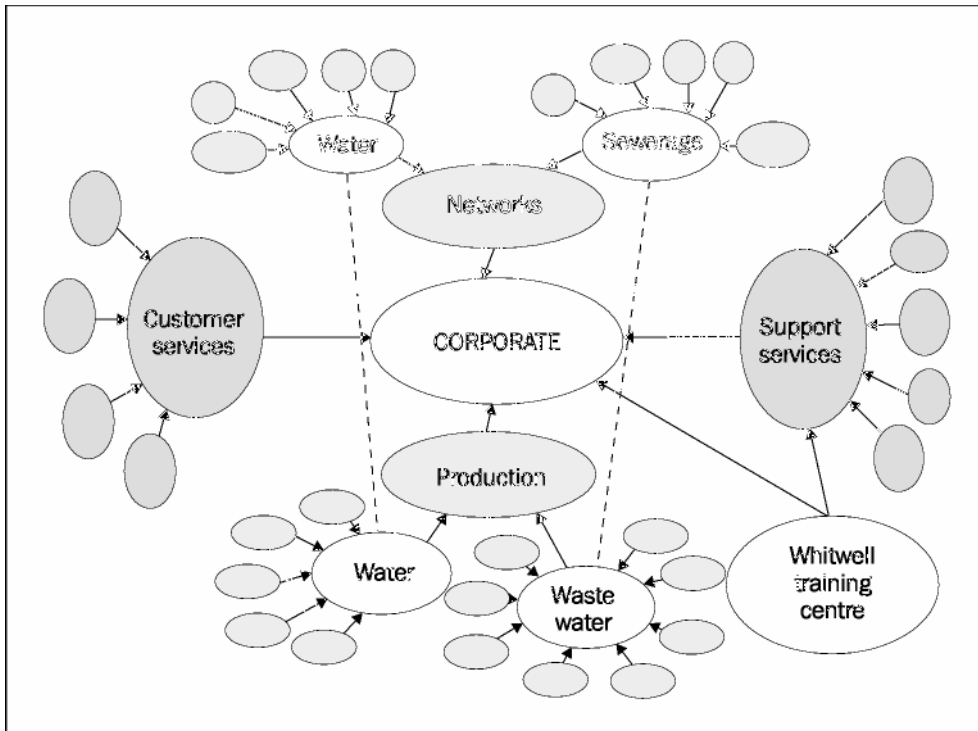
Anglian Water Services<sup>4</sup> (AWS) is the regulated water and waste water business. It is geographically the largest of the ten regional water services companies of England and Wales, with a region stretching from the Humber to the Thames and to Oxfordshire in the West. AWS employs in the region of 5,000 people and has an annual turnover of approximately £700 million.

In 1997, AWS decided to upgrade its three-year-old, centrally operated ABC system based on Microsoft Access to a business intelligence tool. The existing system had analysed all budget centres into activities and processed actual data on a quarterly basis. This meant that activity analysis was discrete to each budget centre and limited in how it could be developed.

*The solution*

A network of process-based models was designed as its replacement, with detailed models for each strategic business unit (SBU) replacing the hundreds of budget centre statements produced via Access. Figure 12.7 shows how the design allowed for the individual (micro) models to be provided for each SBU and a macro company-wide view that could be used for corporate purposes, including a regulatory model.

**Fig. 12.7** AWS – user network



**Fig. 12.8** AWS – billing and collection process (micro)

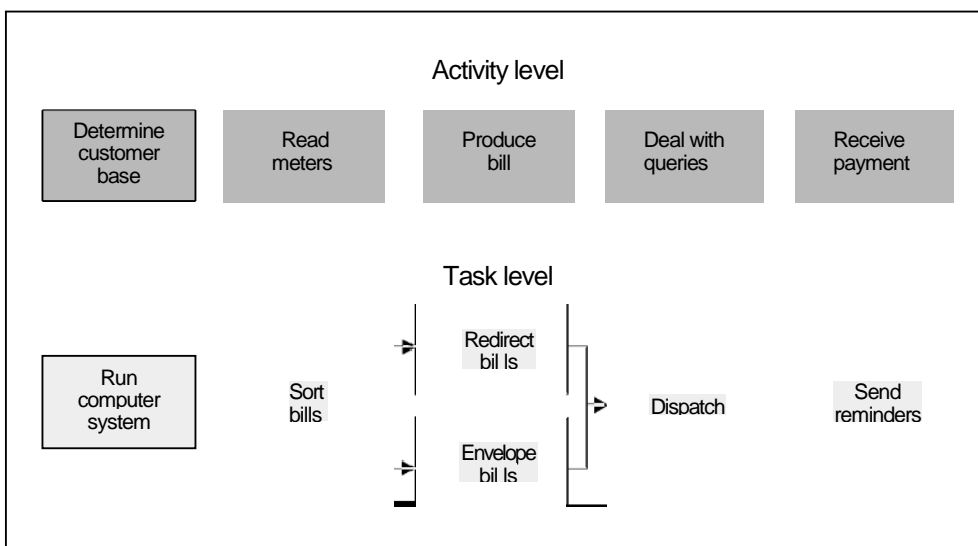
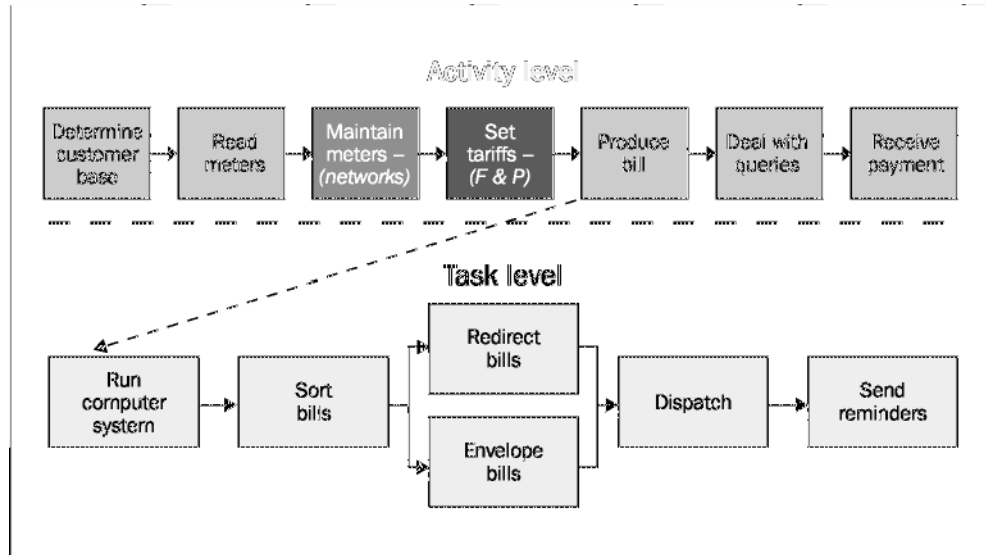


Figure 12.8 shows the process at a micro level as it appears within the Customer Services Department and Figure 12.9 shows the same process at corporate level once it has been merged with other departments/SBUs. It has activities/processes added from the Networks and Finance Departments/SBUs.

**Fig. 12.9** AWS – billing and collection process (macro)



The system is designed so that each of the 40 micro models is owned and run monthly by the SBU performance managers. Once validated, the models are then made available on the computer network/intranet and are accessible by managers and staff, who can manipulate the data in the BI interactive tool. For example, the production drill-down, geographic, operational computer system ARTS 2000, illustrated in Figure 12.10, which all production staff are accustomed to using has been simulated by the BI mapping tool as illustrated in Figure 12.11. This shows the familiar visual but displays cost and output performance information instead of operational data.

Fig. 12.10 AWS – ARTS 2000

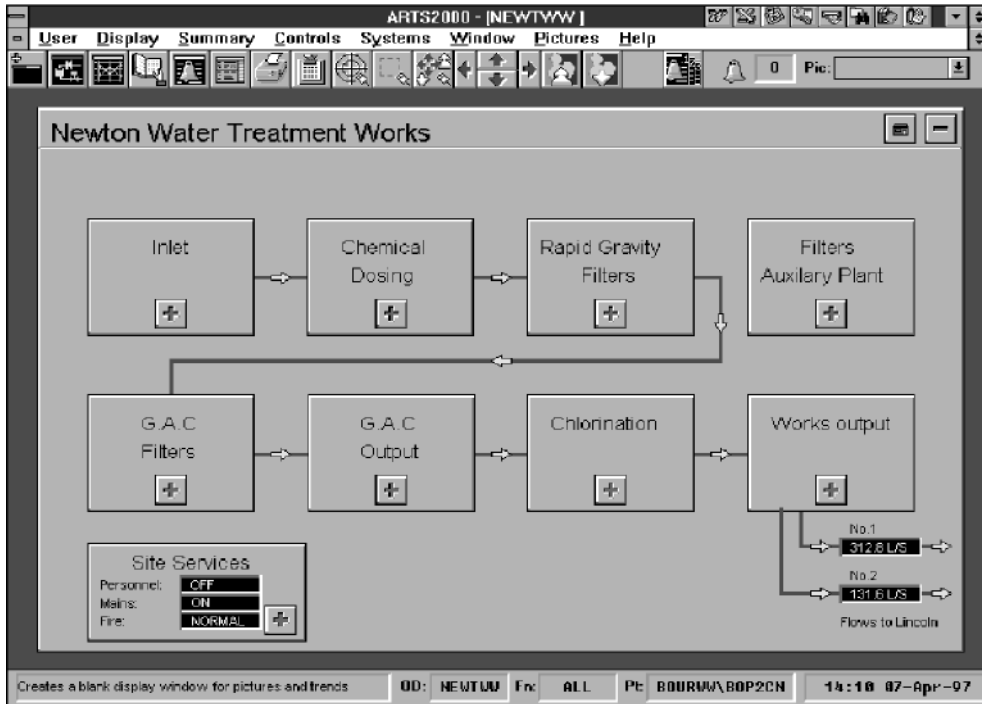
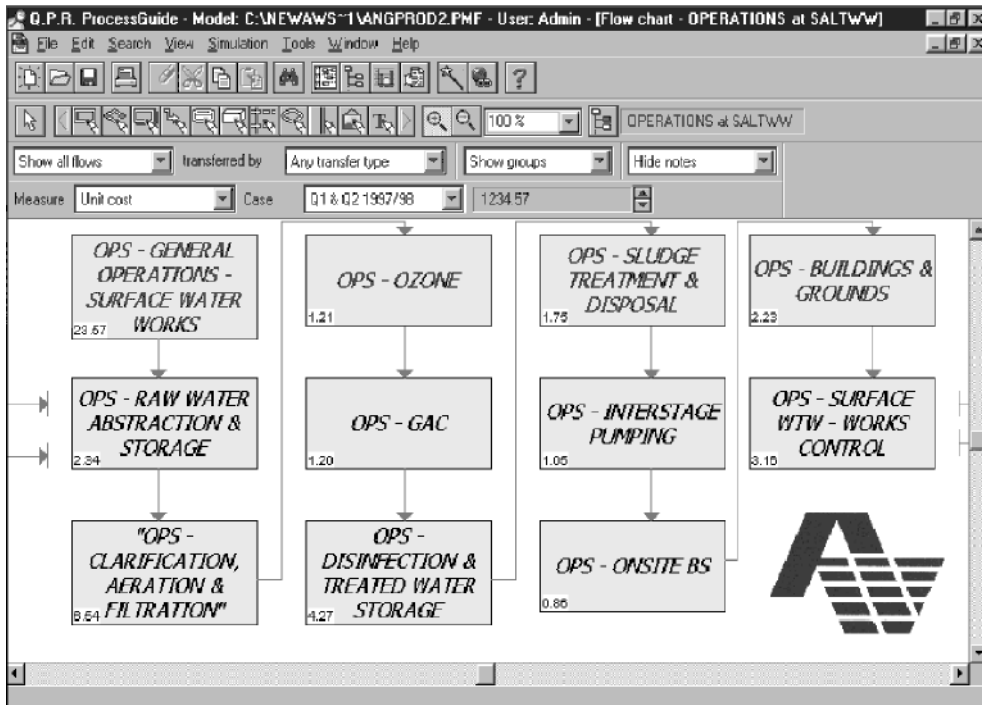
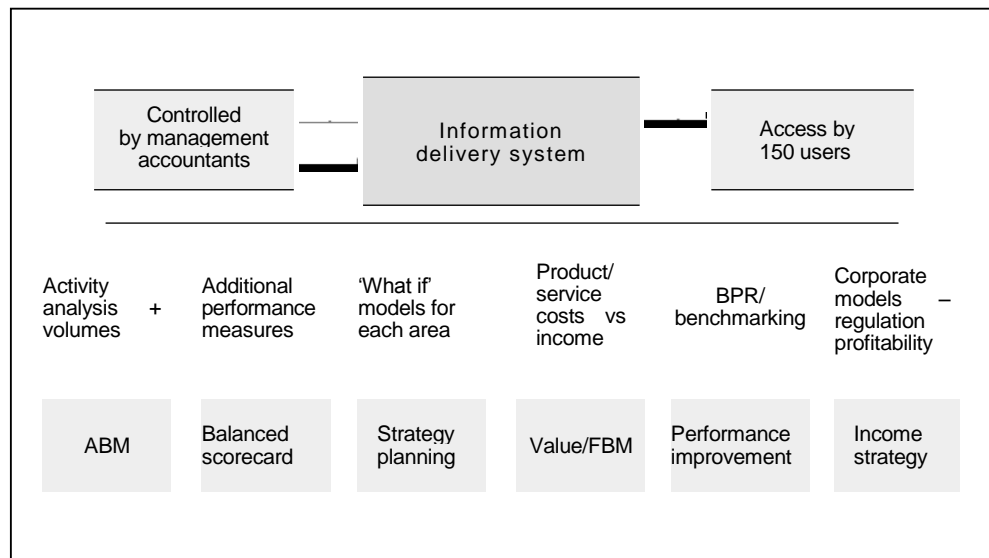


Fig. 12.11 AWS – process view



This new, advanced decision support system was built to provide value-adding features and functionality in an interactive tool capable of being used as the enterprise-wide, end-user information delivery system. As you can see from Figure 12.12, it was designed to download data from the then accounting system Millennium, and then enable it to be converted to the ERP system SAP R/3 once fully implemented. Information is also obtained from numerous other operational systems, depending on the specific micro models, e.g. the production model data coming from the ARTS 2000 telemetry system, the training model data coming from the bookings database.

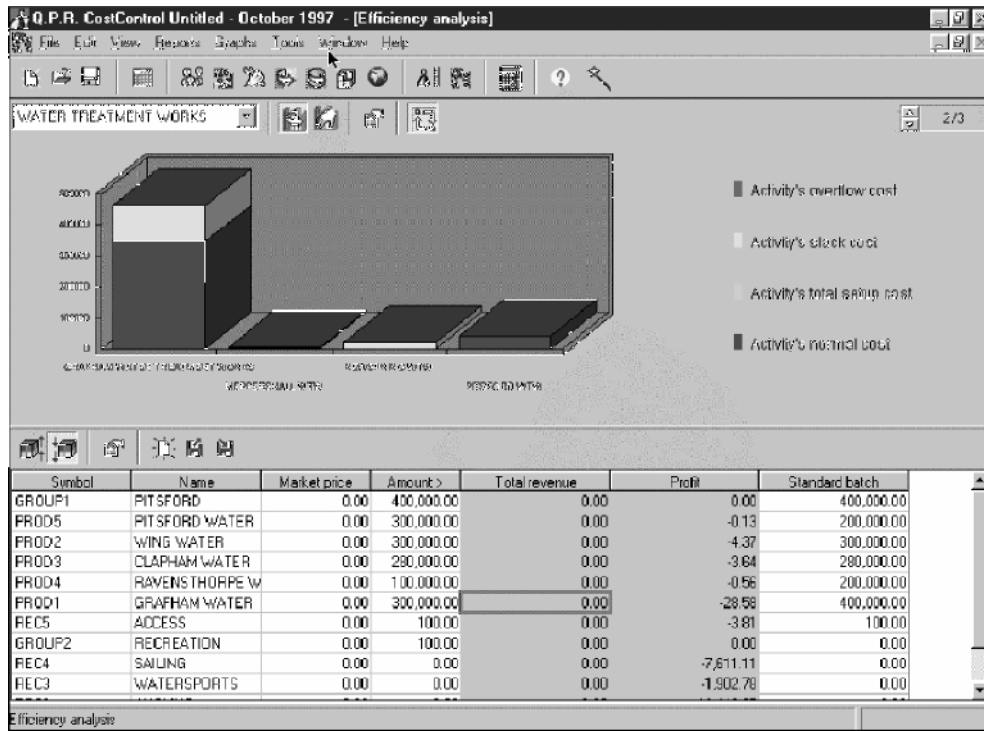
**Fig. 12.12** AWS – system flows



*System uses*

- Outputs from the system provide hierarchical activity/process analysis and unit costs at all levels.
- Product and service costing, compared to income, customer (including internal customers via service level agreements) and market/sector analysis, also incorporating income.
- Asset and income data is incorporated to provide value-based management (VBM)<sup>5</sup> statements, which drill down to the detailed process-based management information held in the models.
- Additional metrics against activities/processes – quantitative and qualitative measures and drivers – enabling drill-down from the corporate balanced scorecard.<sup>6</sup>
- Performance-improvement techniques, e.g. BPR and benchmarking.<sup>7</sup> Considerable opportunities for internal benchmarking exist within the operational areas.
- Creation of a budget model – with fixed, variable and semi-variable indicators on resources that allows for ‘what if’ simulations to be evaluated – an essential tool in the armoury of value-enhancing managers. An example of this feature can be seen in Figure 12.13 which graphically illustrates the impact on resource and process/activity utilization.

**Fig. 12.13** AWS – efficiency analysis







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## Activity/process-based costing

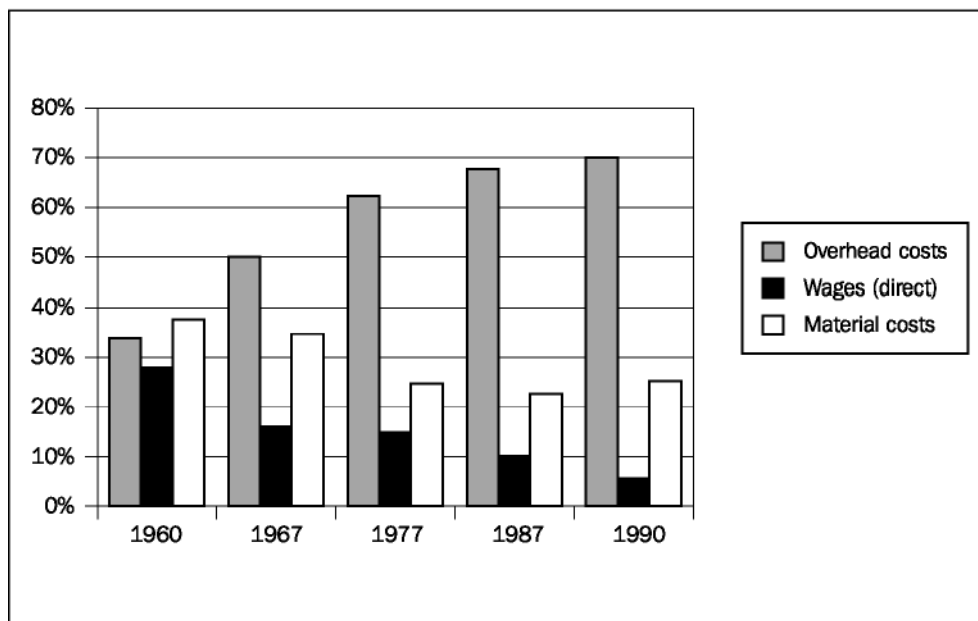
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## INTRODUCTION

Costing systems developed in the first half of the twentieth century, which allocate overhead costs primarily as a percentage of direct labour costs, are no longer appropriate in the world of the twenty-first century. Figure 13.1 (taken from the ABB case study, on pp. 183–87) illustrates why it was reasonable in the 1960s to allocate indirect costs of 34 per cent of total costs (including direct materials) as a percentage onto direct labour of 28 per cent. By the 1990s, the sharp changes in the proportion of the make-up of business costs show indirect costs of 70 per cent of total costs (including direct materials) being allocated as a percentage onto direct labour of only 6 per cent. This can no longer be considered to be appropriate, producing costings that are inaccurate, misleading and dangerous when used for decision-making purposes.

Fig. 13.1 | ABC: changes in cost composition



## RESEARCH

A book written in the 1980s by Kaplan and Johnson,<sup>1</sup> clearly identified the problem illustrated in Figure 13.1, with further evidence of this practice coming from a CAM-I<sup>2</sup> survey, which showed that over 80 per cent of companies allocated costs based on direct labour.

CIMA Research published in 2000 analysed 187 UK companies with turnover of more than £25 million.<sup>3</sup> The findings showed that in 1998/9 an average of 25 per cent of organizations have adopted activity-based costing (ABC) and this rose to 45

per cent for those organizations with over £300 million turnover and to 71 per cent for organizations in the financial and commercial sectors. This usage continues to spread through the application of ERP, Best Value public sector initiatives and the need to better control costs. For example, Shell announced plans to reduce its cost base by \$2.5 billion in 1999 and its rival BP Amoco countered with plans to cut its costs by \$4 billion, both organizations aware of the importance of delivering shareholder value. It can be seen from the case study at the end of this chapter that the Defence Logistics Organization (DLO) is using ABC to reduce its cost base by 20 per cent over five years, saving the taxpayer well over £1 billion a year.

## SIGNS OF THE NEED TO REVIEW THE COSTING SYSTEM

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- lack of official costs being used in product and pricing decisions;
- unofficial cost information being used due to lack of confidence in the information provided;
- sales rising but profits falling;
- expected cost reductions not materializing;
- customers ‘cherry picking’ products;
- decisions being taken by operational managers to outsource the production of components to save high overhead costs which have been allocated via the outdated costing system.

## HOW ABC DIFFERS FROM TRADITIONAL COSTING

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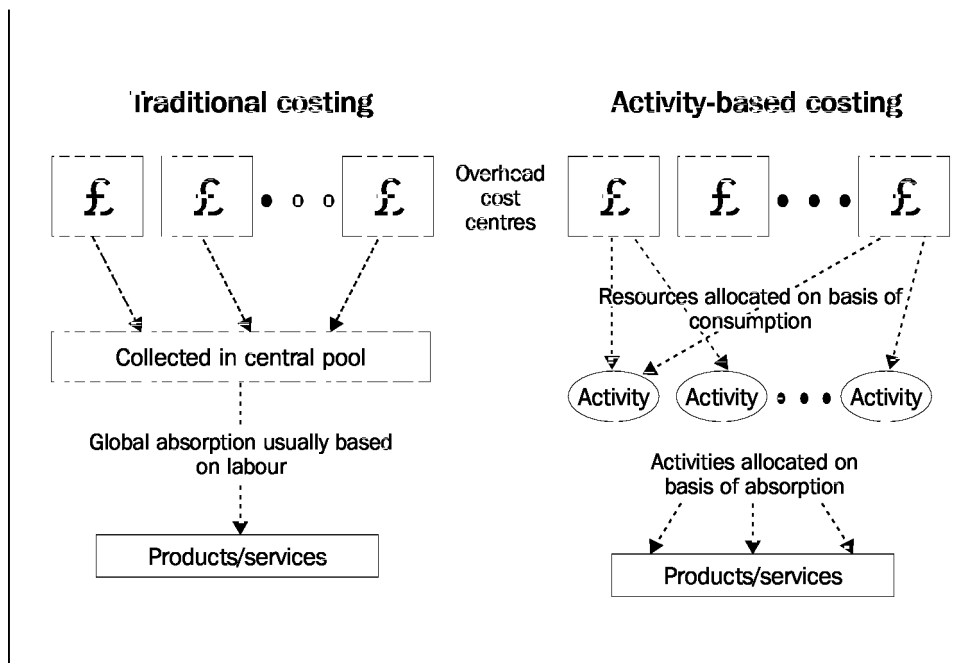
The ability to calculate accurate process, product and service costs and evaluate the profitability of pricing strategies and customers is essential in any organization wishing to be competitive in the twenty-first century. ABC is now accepted and widely used as the most appropriate method of costing processes, products and services. Figure 13.2 shows that while traditional methods collected overhead costs into one (or more) central pools to be arbitrarily allocated to all products and services by a percentage on-cost generally based on labour, ABC puts in an additional step for activities. It allocates resources to activities/processes, prior to allocating activity/process costs to products and services based on actual usage.

By doing so, as seen earlier in the chapter, it enables the business to understand the costs of the activities it performs and to identify their interrelationships. For example, if the overhead cost centre was Finance, the three activities shown in Figure 13.2 might be:

- financial operations
- payroll
- provision of management information.

ABC, then, allows each of these activities/processes to be allocated costs according to how they are being consumed, by identifying their activity drivers, their unit costs and where they are being used. Payroll would have the number of employees as its activity driver and be allocated equally to all employees, while financial operations would probably use the number of invoices processed as one of its drivers and its costs allocated according to usage. The method of allocating resource costs to activities is by a resource driver relating directly to the activity's consumption of resources. In this, the costs of employing the finance staff would be allocated to the activities based on the time they spent on each activity. Similarly, the costs of IT would be allocated according to usage, possibly per package used and/or per PC or number of transactions, and so on with the other resources in the cost centre.

#### How ABC differs from traditional costing

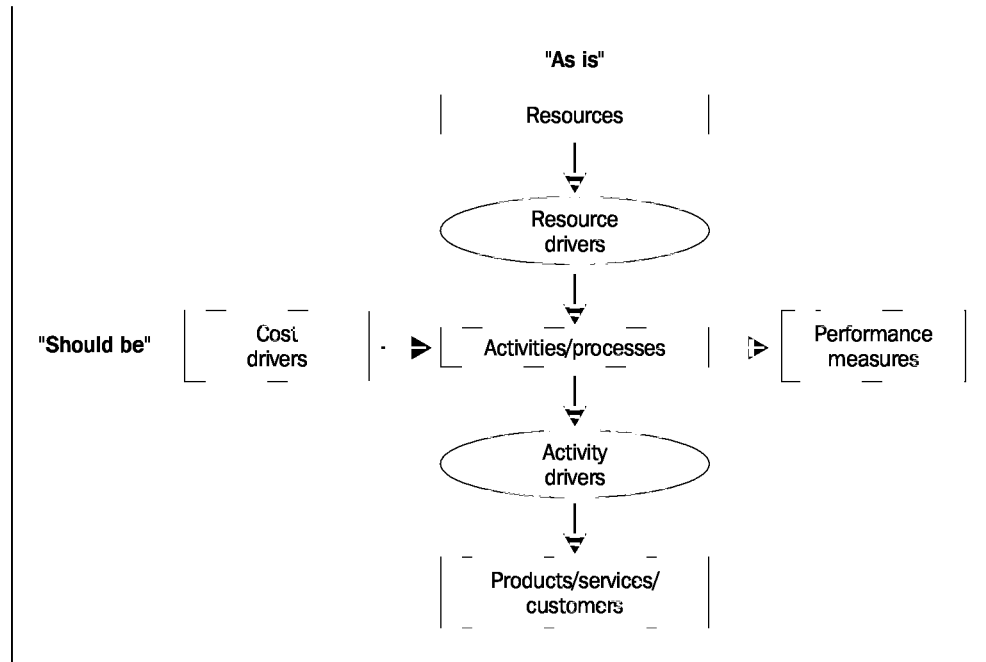


## CHOICE OF DRIVERS

The choice of methods of allocation between resource and activity are known as the 'resource drivers' and between activity/process and the product/service or another activity/process as the 'activity drivers'. The choice will vary depending on the specific circumstances and the information that is available. The term 'cost

driver' refers to what influences or drives the cost of the activity or process and is used in performance improvement initiatives. This is illustrated in Figure 13.3.

Figure 13.3 ABC drivers



Wherever possible:

- Use specific data that relates to consumption.
- Use data that is already available or collected either manually or by computer, or can be easily collected by computer if not currently counted.
- Allocate at as high a level as possible in the activity hierarchy without losing accuracy, usually at the activity or sub-process level (see Figure 12.2 p. 149). This ensures that the ABC analysis remains simple and understood by those who need to use it and that it is not over-complex to maintain, while maintaining its accuracy.
- Gain consensus from all parties involved in the allocation on the best method to be used, in their view. If the data is to be used, their 'buy-in' will be needed. ABC models must not be built in isolation. They need to be understood by everybody in the organization.

Figure 13.4 is a simplistic example of how resources are allocated to the help-desk process by resource drivers, then overhead activities are allocated based on activity drivers. This gives a total cost for the help-desk process and a unit cost per enquiry dealt with by the help-desk, which can be used to allocate costs to the

final cost object, e.g. a product produced or an E2E process, utilizing the help-desk. The example points out that there are a small amount of other costs, termed ‘business sustaining’, that have not been attributed to this or any other activity because it is not appropriate to do so. Business sustaining costs may include such things as legal and audit costs and will be collected in a pool at the centre. The difference between this pool and the pool in the traditional method of costing, illustrated in Figure 13.2, is that it should be minimal, around 5–10 per cent maximum, rather than the 50~ per cent of the traditional overhead pools.

**Fig. 13.4** ABC – help-desk

Direct costs of activities	Resource drivers	Total	Per enquiry £
Personnel costs	Time spent	XXX	XX
Stationery, phone and post	Cost	XX	X
Office equipment/furniture	Depreciation	XX	X
Premises costs	Square foot	XX	X
Travel costs	Cost	XX	X
		XXXX	XX
Attributable costs	Activity drivers		
Management	No. of staff	XX	X
IT	No. of transactions	XX	X
Payroll	No. of staff	X	X
Purchasing	No. of invoices	X	X
Personnel	No. of staff	X	X
		XXXX	XX
Total cost excluding business-sustaining costs		XXXXX	XXX

## ABC EXAMPLE

### A problem with product costing at an insurance company

#### *General information*

To illustrate the benefits of ABC over traditional methods, a simple product costing example is shown, where a fictional insurance company sells two products, a ‘Regular’ and a ‘Super’ policy. It has traditionally costed its policies on a volume-based overhead absorption system, using premium income to absorb overhead. It counts all costs as overhead; there are no direct costs.

*Data gathered in the last financial year*

<i>Policy type</i>	<i>Quantity sold</i>	<i>Average premium*</i>	<i>Customer visits</i>	<i>Underwriting amendments</i>	<i>Computer enquiries</i>
Regular	70,000	£50	1	1	2
Super	10,000	£100	5	8	6

\* Numbers represent income per policy.

*Overhead costs gathered by activity*

<i>Activity</i>	<i>£000s</i>
Selling	360
Underwriting	300
Computing	140
Premium collection	100
Total costs	900

The questions

1. Calculate unit overhead costs for the Regular and Super policies by the traditional system based on value of premium income.
2. Using an activity-based product costing method and the data available, recalculate unit costs on the basis (drivers) that seems appropriate. Explain your choice of drivers.
3. Indicate the advantages that ABC can provide to aid decision making.

The answers

*1. Traditional costing system*

	<i>Quantity 000s</i>	<i>Unit premium £</i>	<i>Premium income £000s</i>
Regular	70	50	3,500
Super	10	100	1,000
			4,500



Overhead costs:			
Premium income	900,000	=	20 pence/£ or 20%
Unit overhead costs:	= 4,500,000		
Regular	£50 ~ 20% = £10		
Super	£100 ~ 20% = £20		

## 2. Activity-based product costing

Overhead	£000s	Driver	Freq. ~ Qty	Cost ~ Total freq.	Unit cost
Selling	360	No. of customer visits	1 ~70	360	£3.00
			5 ~10	120	
Underwriting	300	No. of amendments	1 ~70	300	£2.00
			8 ~10	150	
Computing	140	No. of comp. enquiries	2 ~70	140	£0.70
			6 ~10	200	
Premium collection	100	No. of policies sold	1 ~70	100	£1.25
			1 ~10	80	
		<i>Cost/driver ~ frequency/unit</i>	<i>Regular</i>	<i>Super</i>	
			£	£	
Selling	£3.00	1	3.00		
	£3.00	5		15.00	
Underwriting	£2.00	1	2.00		
	£2.00	8		16.00	
Computing	£0.70	2	1.40		
	£0.70	6		4.20	
Collection	£1.25	1	1.25		
	£1.25	1		1.25	
			£7.65	£36.45	
Compared to traditional			£10.00	£20.00	
Under (over) costed			(£2.35)	£16.45	

## 3. Advantages

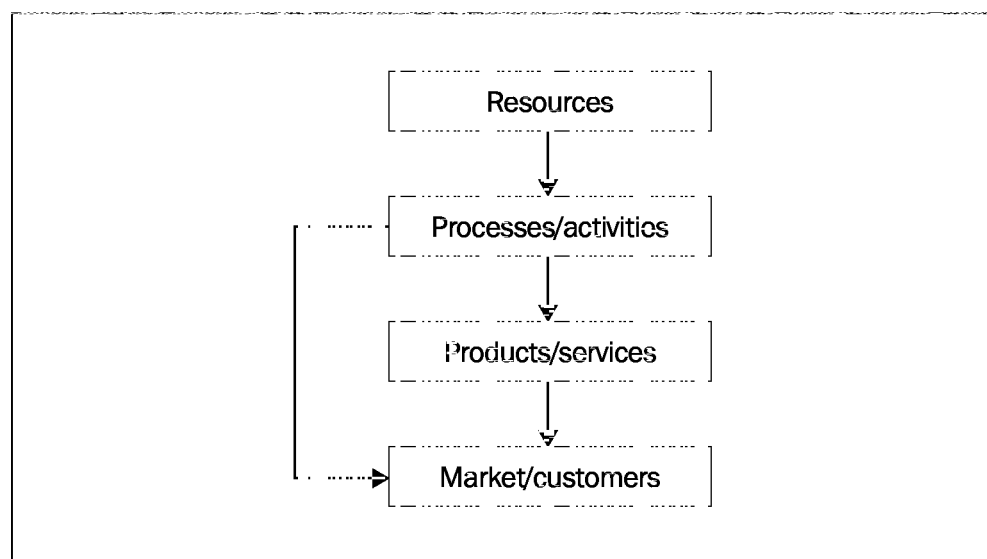
The example illustrates how, by introducing four distinct activities/processes, each with its own driver or method of allocation, into the methodology and counting the

frequency with which they occurred, it is possible to calculate the unit cost of each activity/process output. It can then be allocated to the type of policy based on the number of outputs of that activity that the specific product consumed. This allows the varying complexity of the different products to be represented within their costs. As a general rule, high-volume, less complex products tend to be over-costed by 10–30 per cent (in this case 23.5 per cent) and low-volume, more complex products tend to be under-costed by 50–400 per cent (in this case 83 per cent).

## CUSTOMER PROFITABILITY

Figure 13.5 shows the allocation to the fourth dimension of the ABC model, beyond products and services to markets and customers. By multiplying product and service costs and revenues by the volume of sales to each customer the true profitability of each customer can then be ascertained. It will be necessary to allocate any customer-driven activities directly to the market or customer, e.g. the activity costs of selling in China would be allocated directly to that market area and ‘trickle down’ to the customers within it.

**Customer profitability**



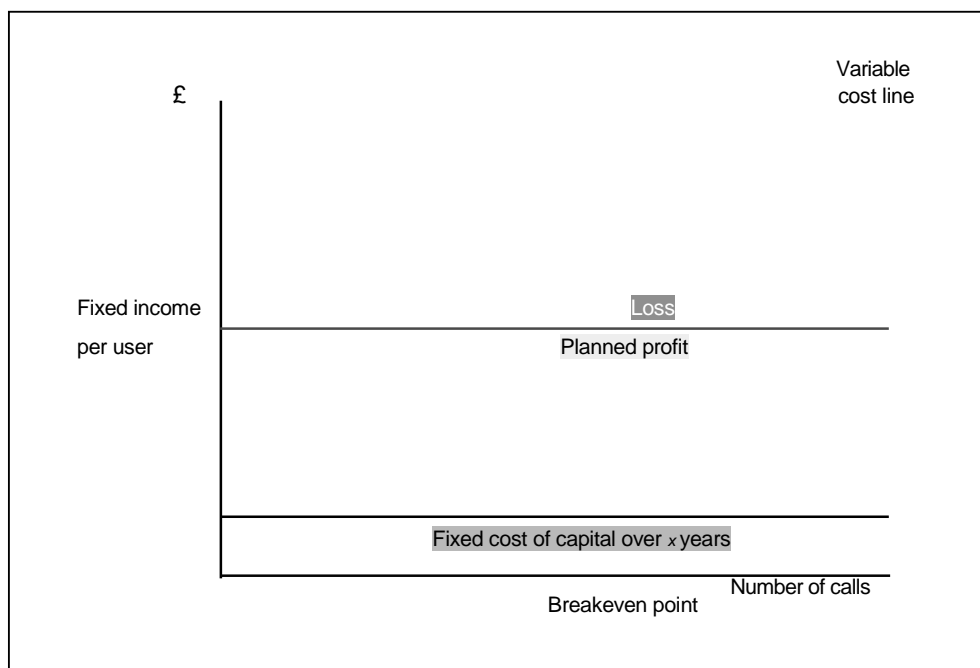
### Pricing scenario example

An IT outsourcing company provides operational and support products and services to clients based on a fixed cost per user, e.g. per PC. After building an ABC model of the costs of its services and identifying the cost drivers, the company discovered that the basis of the pricing mechanism, although variable

based on volumes, was often different to the way the costs were being driven, thus identifying an unnecessary risk. For example, the help-desk support service is charged on a fixed price per user, but the costs are primarily driven by two variable cost drivers: the number of calls and the length of calls made to the help-desk, with a small fixed capital cost per user for the equipment spread over a number of years.

Figure 13.6 shows at what point, in terms of the number of calls received, the outsourcer will start to show a loss. The outsourcer's risk can be reduced by changing the pricing mechanism to reflect the way the costs are being driven; this change would also give the customer an incentive to reduce the number of calls made by its staff, taking responsibility for driving cost. By both parties working in partnership, through investing in new help-desk technology and undertaking the training of help-desk staff and system users, the number and length of calls could be reduced to the benefit of the customer and the removal of risk to the outsourcer.

**Fig. 13.6** Help-desk pricing



## PROCESS-BASED MODELLING

Software allows complex models to be built and ‘what if’ scenarios to be performed on them to aid decision making and planning and to optimize performance. It is enormously powerful to be able to back calculate, by making changes to product/service volumes and selling prices and simulate the effects on profitability,

activities/processes and resource utilization, where fixed, variable and semi-variable indicators can be applied. Sophisticated common data models that can simulate the workings of the business are essential tools for adding company-wide value and are discussed further in *Transforming the Finance Function*.<sup>4</sup>

### **Case study 13.1**

#### **Defence Logistics Organization<sup>5</sup>**

In 1999 the government announced its plans to meld all the logistics and support services for the country's Army, Navy and Air Force into one body called the Defence Logistics Organization (DLO). Its motives were to cut costs. From its inception in April 2000 it was instructed to reduce its £4.6 billion annual operating costs by 20 per cent by 2005, without reducing any services provided by its 43,000 staff. The DLO is involved in everything from supplying uniforms for soldiers to repairing warships. It operates through integrated project teams (IPT), which are customer-focused. Previous to the merger each service operated its own logistics services, with maintenance and procurement often outsourced to the 44 agencies that made up the MoD. The DLO recruited PwC and Deloitte Consulting to help it deliver these targets.

By the end of March 2001, all of its 75 BUs, which are multi-million pound businesses, had begun using ABC. Before beginning, the DLO had to introduce resource accounting, which entailed producing a balance sheet for the first time – the previous system measured units of cash expenditure against annual budgets. The DLO's ABC roll-out was one of the first public-sector organizations in Europe to use fully-fledged ERP, so it initially used a standalone package as back-up to mitigate any risks. The migration to the ERP system was planned for completion by summer 2001. The Army, which started the project in April 2000, was able to reduce costs even in its first year, particularly in its supply chain efficiency. This is not the MoD's first success with ABC – it had been in use by the Defence Evaluation and Research Agency (DERA) since 1996.

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# Business process performance improvement

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## INTRODUCTION

The use of activity analysis for improving company-wide performance has been regarded as good practice since the late 1980s. Its use to remove 'non-valueadded' activity was seen as an excellent way of reducing costs, but the early focus was on activities within functional departments. Each cost centre would analyse its activities and then classify them.

## ACTIVITY CLASSIFICATION

### Primary value added or core

These are activities that are 'essential' to the being of the organization, delivering the products or services that denote the business's existence. They add value and meet customer needs. When identified, focus on these activities will encourage enhancement, improvements in effectiveness and variation in levels of service.

### Primary non-value added or diversionary

These are activities that are usually considered 'urgent' because they result from failure elsewhere. They are regarded as adding cost without adding value to the business. This category of activity needs to be eliminated by getting things right first time, removing unnecessary barriers and improving methods and systems. Activities classified in this category include:

- approving
- filing
- reviewing
- preparing
- inspecting
- accumulating
- decanting
- searching
- expediting
- storing
- moving
- counting
- retrieving
- revising.

### Support or secondary

These activities are considered ‘necessary’ to enable core activity to take place. The focus on support activities is to make them more effective through improved methods and systems and variations in levels of service and inter-business unit charging, which is discussed in *Transforming the Finance Function*.<sup>1</sup>

## ACTIVITY-BASED COST MANAGEMENT

After conducting classification or value analysis, early activity-based cost management (ABCM) programmes would hold workshops to discuss the analysis and find improvements by focusing on the elimination of non-value-added activities at:

- cost-centre level;
- departmental level;
- corporate level.

The understanding of what activities are performed, their classification, their cost make-up and their unit costs allows their cost drivers to be identified, i.e. those factors that drive or influence costs. For example, in Finance such influences might be:

- system availability;
- number of cost centres;
- number of ad hoc requests;
- changing business requirements;
- number of upgrades made to systems;
- number of system users.

Cost drivers, i.e. influencers of cost, are not to be confused with methods of allocation used in activity-based costing, which are known as activity drivers. Typical activity drivers in Finance would include:

- number of sales invoices;
- number of purchase invoices;
- number of cost centres;
- number of reporting periods;
- number of customers;
- number of suppliers;



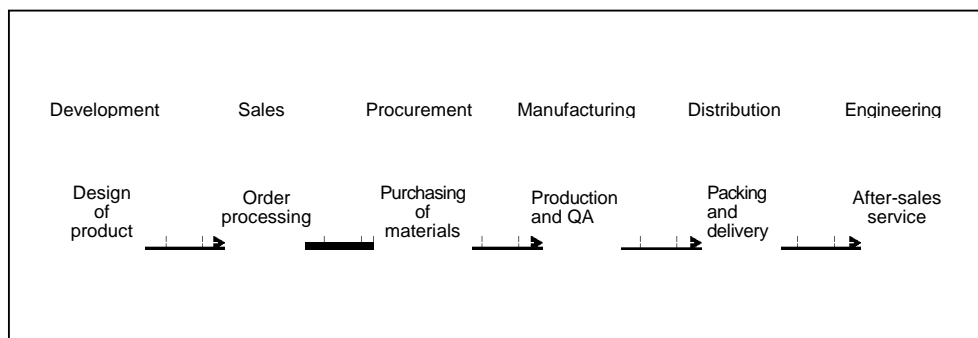
- number of PCs;
- number of system users.

## REMOVAL OF CONSTRAINTS

The result of a functional focus was that activities were optimized within their function, irrespective of the effect on the rest of the business. An example would be where attention is focused on the activity ‘after-sales service’, which forms part of the engineering department (*see* Figure 14.1). Improvements within the function would focus on quicker response times to customer calls or a faster repair cycle, not on the cause of the fault which requires repair. The fault may go back in the value chain to:

- *distribution* – there might be problems with packaging or delivery;
- *production* – there may be problems with manufacturing;
- *procurement* – the wrong or substandard materials may have been purchased;
- *sales* – the order may have been wrongly processed;
- *development* – the design of the product may be the cause of the need for ‘after-sales service’.

**Fig. 14.1** Value chain



As a result, in the early 1990s it was realized that such performance-improvement initiatives should focus on processes, irrespective of functional boundaries; hence the birth of business process redesign and its big brother, business process re-engineering (BPR). The latter is where an organization also looks at all outside influences to find more innovative solutions – E2E processes would be an example. Johnson emphasized the need to remove constraints, i.e. practices and assumptions that cause delay, excess and variation of processes that cause further work, not to optimize within them.<sup>2</sup> He questioned the categorization of non-value-added tasks

as ones that must be removed and instead argued that, if the activity was being performed, then it was considered essential within the constraints that management had laid down for performance of that activity. The insistence of ABCM teams in asking workers to categorize their work as ‘non-value-added’ activity proved counter-productive and demotivating to staff. Activity categorization is still useful within project teams, but the use of the alternative descriptions ‘core, diversionary and support’ are less emotive and are recommended.

## BUSINESS PROCESS RE-ENGINEERING

### Introduction

While activity classification or value analysis still has its place within project teams, the focus of business improvement initiatives is now rightly directed at processes and the removal of constraints. Business process re-engineering (BPR) has acquired something of a bad reputation since it was first proposed by Hammer and Champy in the early 1990s.<sup>3</sup> A statistic often quoted was that ‘seven out of ten BPR projects fail’, without any clear definition of what constituted either BPR or failure. The principle of examining processes to see if they can be improved by redesign is sound, but like all projects it should have clearly defined objectives and senior management backing to carry through those objectives, even if this is sometimes politically difficult. The management of change is dealt with separately in Chapter 15.

Analysing the flow of activities within a business process can help to identify:

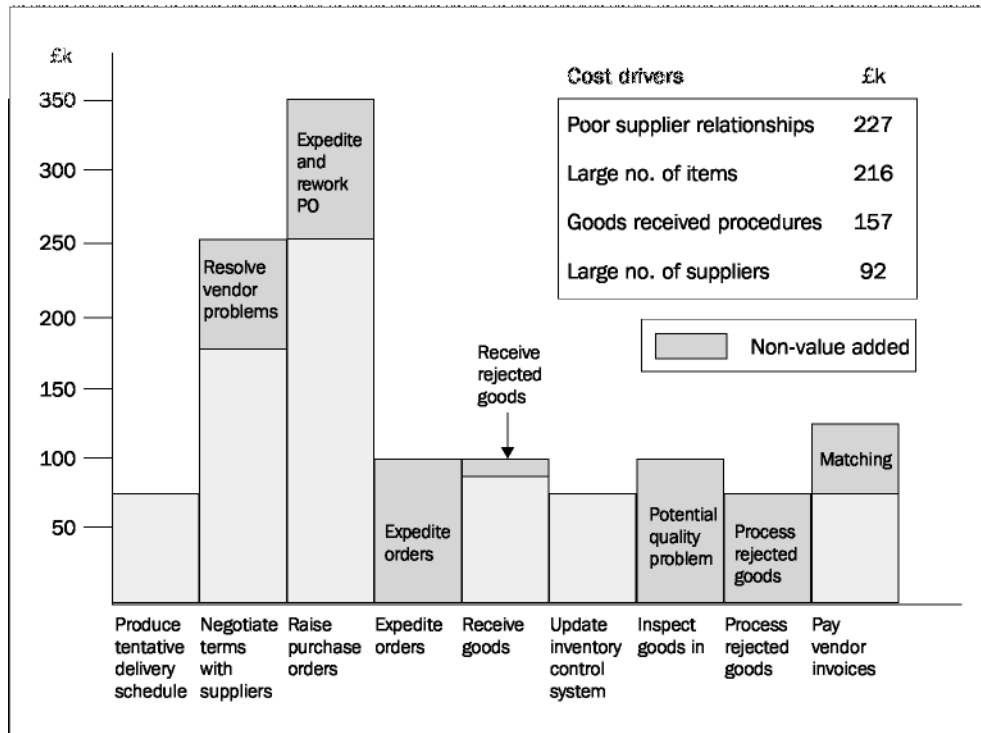
- duplication
- missing activities
- wasteful activities
- over-bureaucratic procedures
- bottlenecks
- measurement of each activity within the process.

### Steps in a BPR programme

- Decide on the processes to be examined and their order of priority.
- Appoint a process-review project team, comprised of representatives of all parts of the process to be examined, including external in E2E processes.
- Carry out hierarchical process analysis as explained in Chapter 12 (p. 148–50).

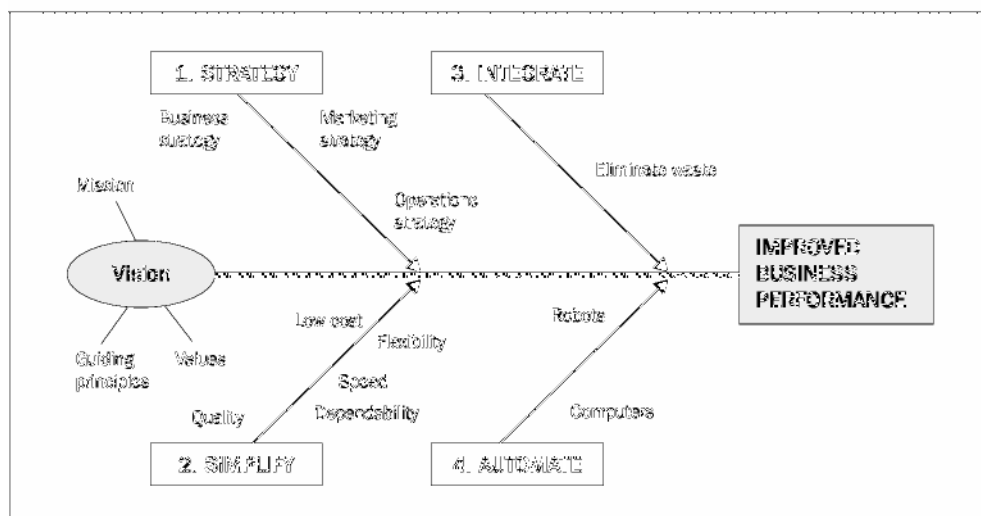
- Draw process maps and graphics, showing flows, costs, cost drivers, value analysis and functional and geographic boundaries (see Figure 14.2).

Fig. 14.2 The procurement process (£1.1 million)



- Use other tools and techniques to illustrate all of the factors relating to the particular process under examination. See, for example, Figure 14.3, cause and effect analysis, for brainstorming and analysis. This figure has been used to depict the technique while reminding analysts of the areas of improvement to look for.

Fig. 14.3 Cause and effect analysis



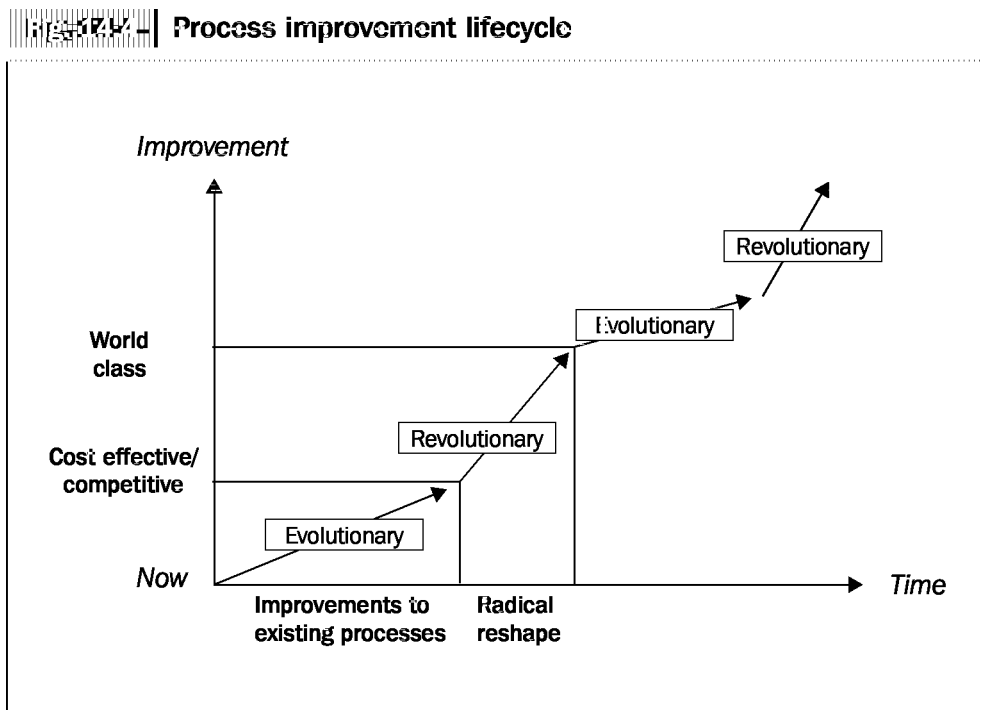


Figure 14.4 on the other hand, illustrates the effect of performance improvement ideas on the process. Some 90 per cent of ideas from these initiatives are small and easily implemented, while 10 per cent are larger and require more radical change, such as a new computer system.

- Hold brainstorming workshops to discuss and agree changes and establish best practice within the process. The project leader should never attempt to tell the process representatives directly what they are doing wrong or it is probable that the ‘not invented here’ syndrome will be encountered. Allow the project team to draw its own conclusions from the information presented.
- Set implementation and performance targets and responsibilities and monitor progress.

### Benefits of BPR

- Brings about a better understanding of the relationships between activities/processes allowing a radical rethink of how they are performed.
- Ideas for improvement are identified by people within the process, who are motivated to implement the changes.
- Is a cross-functional project which helps to improve communications throughout the business.
- All levels of staff are involved in the process, encouraging ownership and accountability for performance.

- Commitment to continuous improvement is built at all levels in the organization.
- Identifies priority services and any ‘gaps’ in the process.
- Enables the evaluation of alternative service levels.
- Facilitates comparison of costs with other similar organizations (benchmarking).
- Allows the examination of the effectiveness of all services to be evaluated, including support services.
- Enables value for money or best value to be demonstrated.

### Case study 14.1

#### Asea Brown Boveri<sup>5</sup>

##### *Background*

Asea Brown Boveri<sup>5</sup> (ABB) is a global \$30 billion engineering and technology group serving customers in electrical power generation, transmission and distribution; automation; oil, gas and petrochemicals; industrial products and contracting; and financial services. ABB employs 200,000 people in over 100 countries.

##### *ABC and BPR project objectives*

True to its tradition of innovation and leadership, ABB launched a company-wide ABC project in 1996. Volker Hevler, Vice-President and Project Manager ABC Group based at ABB headquarters in Zurich, Switzerland says that the decision taken was to implement ABC as ABB's common costing method throughout the world by the end of 2000. He stated that:

*The decision to go for ABC represented a corporate concern and priority to, at the end of the day, further our competitiveness in an increasingly global and competitive marketplace. We set our sights very high from the start – ABC must cover the entire group and include full management buy-in and commitment. It is not sufficient to use ABC in your current cost accounting system or to use it as a parallel tool. Rather you must do it by the book and progressively.*

One reason behind this decision was the recognition that there had been a significant change in the make-up of product costs during the preceding three decades. Indirect costs are now a larger proportion of the whole and there is a need to find a better way of assigning those costs than purely by percentage allocation (see Figure 13.1, p. 163).

ABB's objectives were fourfold:

- to cost and price products better by assigning many more indirect costs to products and services than can be achieved with traditional cost accounting;
- to enable better management with thorough analyses and insights into activities and processes;
- to use ABC as a tool for change management in the organization and its processes;
- to facilitate strategic decision making based on relevant cost calculations.

### *Methodology*

The analysis was aided by the use of a software tool from Sweden chosen by ABB to provide an ABB-tailored solution for use as a standard worldwide.

Although the project was defined and driven by the Central Project Group, the execution and implementation were the responsibility of each country's management. Local projects in the operating companies were led by experienced certified facilitators. The UK ABC manager, Andy Daniels, was responsible for 29 projects running in 18 operating units, assisted by ten trained facilitators.

One of the benefits of a standard methodology is the ability to offer cross-border support, e.g. teams from the UK successfully worked on projects in both the US and Turkey. This not only overcame resource problems but created the opportunity to share experiences.

### *Project stages*

- *Stage 1* involved the analysis of processes and activities in the business followed by optimization of those processes; in addition, data was gathered about cost drivers, business volumes and resources. This involved interviews with all members of staff to ascertain the type of work done. This created a detailed picture of the business when combined with the relevant financial information and enabled selection of the key processes that would offer the greatest opportunity for improvement.

These processes were mapped in detail in two forms:

- 'as is' – how the work is actually done now;
- 'should be' – the optimized way of performing the work.

In order to move from the 'as is' situation to the 'should be', an action plan was developed and implemented. This key step involved the creation of cross-functional teams, who actually worked in the process and experienced the day-to-day problems. This also served as a good teambuilding and learning experience.

- *Stage 2* used the data from Stage 1 and developed an integrated cost accounting solution, which resulted in the regular reporting of financial performance using ABC as the base.

### *Company A implementation*

Andy Daniels explains:

*Experiences of Stage 1 projects in the UK were generally favourable, with many good examples of employee-driven change. However, not all projects were a success and there were lessons to be learned from both the successes and the 'non-successes', where the results could be better with improved focus.*

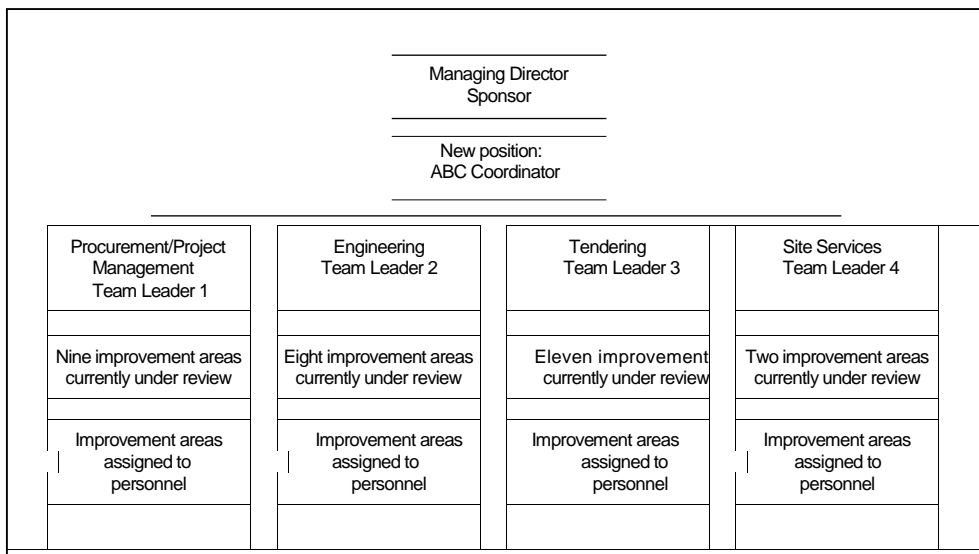
One of ABB's success stories in the UK is Company A, which is involved in the management of large-value projects and the subsequent provision of spares. Created by the merger of two divisions following an acquisition, there were a number of cultural differences to overcome, as well as the inefficiencies of duplication. From the first meeting, management

recognized the benefits that could come from the project and made a firm commitment to ensure success. This positive message was sent throughout the company and helped to overcome the sceptics.

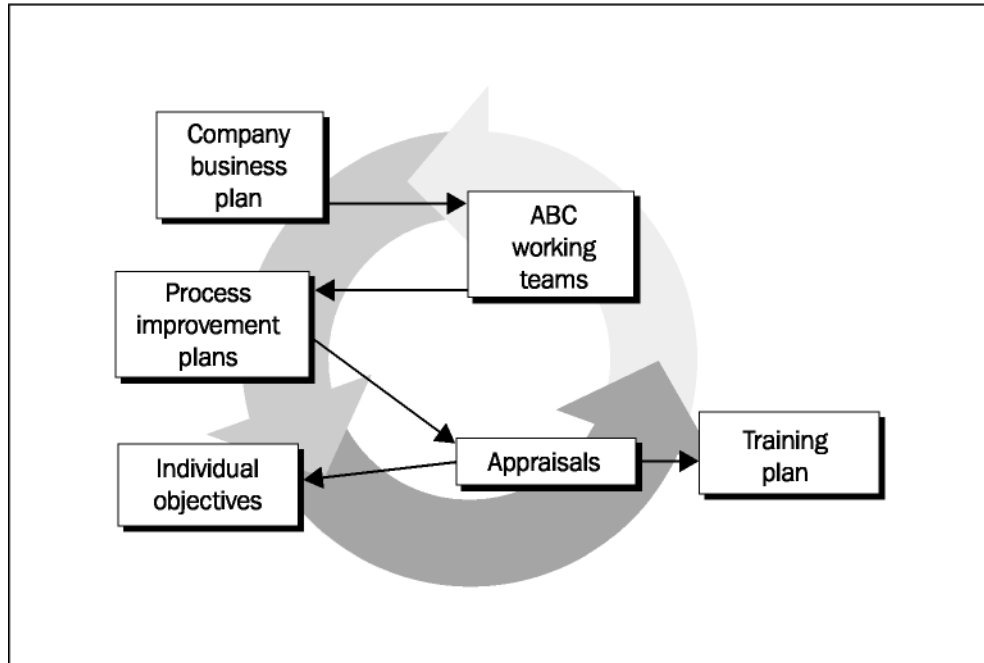
The initial analysis identified that three out of 17 processes accounted for over 50 per cent of the indirect cost base – clearly, these were the areas on which to focus. Teams were set up to map the processes, ensuring that the make-up was representative not only crossfunctionally but also cross-business unit. The outcome was a common set of recommendations for change, which were presented to management. It was clear from these recommendations and the initial analysis that there were significant opportunities for savings. However, there was still a degree of scepticism that anything would be done with this information, previous initiatives having suffered from poor follow-up.

Management’s response to this was to appoint a company coordinator with responsibility for ensuring that the opportunities became reality. A team structure was put in place to ensure continuity with the mapping teams and also to involve as many people as possible, as illustrated in Figure 14.5. Each of the five teams was tasked with looking at one of the key improvement areas – setting targets and timescales that were acceptable to both staff and management. The role of management became one of support rather than execution: making time (a scarce resource) available for more team meetings.

**Fig. 14.5** ABB – ABC working team structure



One common failing of ‘improvement’ initiatives is that they are not coordinated with the overall business plan, leading to confusion and frustration. Company A has sought to overcome this by putting in place a link between the business plan, the improvement plans and individuals’ objectives. This link is created through the improvement teams and an appraisal scheme, which in turn is the basis for the training plan, as seen in Figure 14.6.

**Fig. 14.6** ABB – linking the plans*Measures of success for Company A**External*

The real test of any project is whether the changes bring results, especially in the area of customer relationships. For this company, the proof came when it applied its new optimized tendering process to a customer enquiry that it had no real prospect of winning – all previous bids to this customer having produced no orders. Resources were assigned to follow the new process and the bid was submitted. Despite not being the lowest price, the contract was awarded to ABB on the strength of the quality of the bid.

*Internal*

The project has brought about change in a number of ways. Previously two engineering departments worked separately with different standards, mainly for historical reasons (the 'but we're different' syndrome). The experience gained from working together during the process mapping sessions demonstrated that the differences were more perception than reality. There is now one engineering department working to common standards.

*Keys to success at Company A*

- Early buy-in from general manager.
- Strict adherence to timetable, demonstrating commitment.
- Teams working on own initiative.
- Additional mapping sessions facilitated locally.
- Separate engineering departments brought together using common working practices.
- Used as introduction to form strategic alliance with key customer.



## Conclusions

### Keys to success of the overall project

- Buy-in from senior management – *not just lip service.*
- Experienced facilitator(s) to lead the project – *overcomes resistance at all levels.*
- Dedicated resources to work on project – *keep to agreed timescales.*
- Structured approach to improvement opportunities – *look for the quick wins.*
- Communicate, communicate, communicate – *people are more comfortable when they know what is happening, even if it is bad news.*

It was essential that to gain the maximum benefit from the new measurements that ABC brought, it was necessary first to change the way in which the business was managed. Simply implementing a new costing system would not improve the business. Likewise, optimizing your processes without ongoing, meaningful measurements would not bring about lasting change and real business improvement. Finally, without the active support from senior management the chances of success would have been reduced considerably.

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# Change management

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## INTRODUCTION

In 1995, 62 per cent of UK managers were affected by some sort of organizational change programme; in manufacturing and financial services, it ran at 75 per cent; in utilities it reached 90 per cent.<sup>1</sup> In the twenty-first century change is a constant. For organizations which manage change skilfully, it can become the driving force that perpetuates success and growth, with every change presenting a new opportunity to increase efficiency or to build the business. But all too often change fails as companies do not rise to the challenges it brings.

The reasons for failure often come from within the company:

- misunderstanding of what change is – *it is a process not an event*;
- lack of planning and preparation – *provide skills and training*;
- goals are set too far in the future – *short-term wins are important*;
- complacency – *the belief that past success was based on how things are done*;
- employee resistance – *a combination of inertia, scepticism, fear and misunderstanding*;
- Risk-averse, blame culture – *fear of failure*.

The move from top-down command and control culture to an empowered bottomup approach through the 1980s and 1990s has led to great success for those organizations which have made the change successfully.<sup>2</sup> Equally, the move from functional to process management now underway in E2E process organizations is challenging and demands the use of active change management.

## ACHIEVING SUCCESSFUL CHANGE

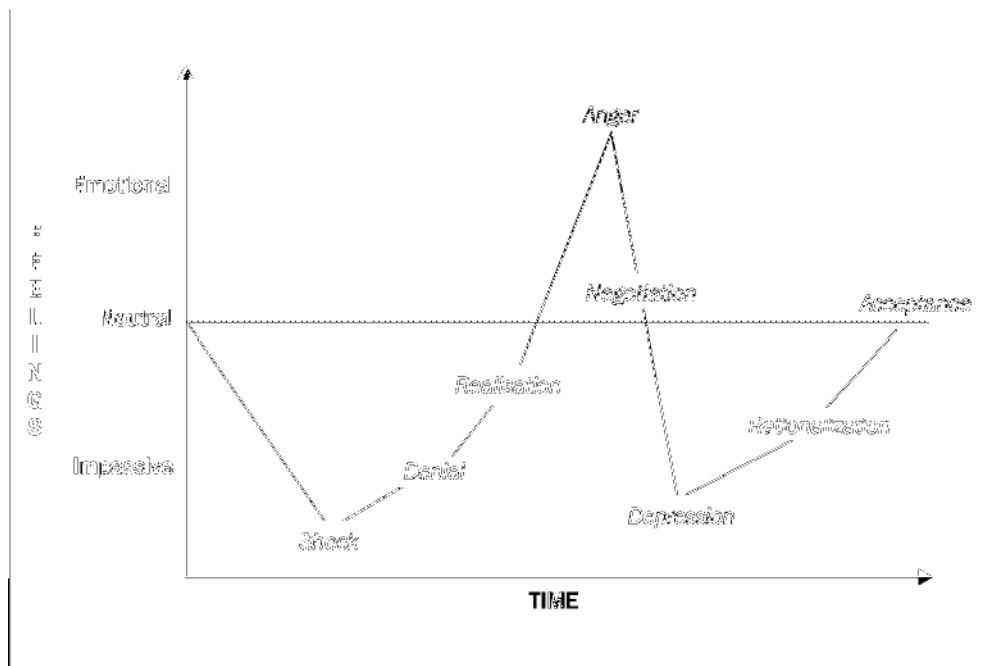
ABC and BPR have received much bad press in the past, with high failure rates reported. Like all the techniques and tools explained in this book, their success depends entirely on how they are implemented. Far too many of these initiatives were, in the past, regarded as mechanical exercises, often undertaken by engineers or accountants with little or no regard for the human component. The success of change using BPR and other techniques is dependent on involving staff at all levels, gaining their ‘buy-in’ and commitment, selling them the benefits, allaying their fears about job losses that may result, to gain their trust and cooperation. Such involvement, commitment and support are needed as much from middle and senior management as from the staff performing the work. Far too many traditional managers see change and new ideas as threats to their security and, even worse, as personal criticism of their existing systems. All of these problems need to be understood and dealt with when making any of the changes discussed in this book.

It was Machiavelli who said:

*Change is difficult – those who stand to lose will resist, while those who stand to gain don't know it yet.*

Figure 15.1 shows the normal negative reaction of those who are subjected to change. The speed at which people move from shock to acceptance will vary considerably from person to person. Nick Obolensky says that resistance is a natural occurrence – to overcome it, one must motivate changes in people's behaviour.<sup>3</sup>

**Fig. 15.1** The impact of change



*Techniques to motivate change in behaviour*

- Bring resistance to the surface and continually gauge readiness for change.
- Create and maintain dissatisfaction of the status quo.
- Generate new training for new skills.
- Allow participation in planning and implementing change.
- Reward required behaviour and results in the transition and future states.
- Provide time for people to disengage from the current state.
- Use pilots and reposition the remainder.
- Burn bridges and build ambassadors.
- Actively manage in/out-placement in a firm, clear and sympathetic way.

### *SMART objectives*

- S Specific
- M Measurable
- A Achievable
- R Results oriented
- T Time specific

### *The culture change process*

- Use cross-functional project teams throughout the process.
- Use workshops to build consensus, awareness, commitment and feedback.
- Use facilitators widely to assist smooth implementation.
- Employ training seminars to develop new skills and attributes.
- Establish a team to act as a focal point of change and learning.
- Use a values statement (ten commandments) to summarize needed behaviours.
- Communicate – use a wide range of media, manage the communications process and remember: actions speak louder than words, so lead by example!

### *How to motivate your staff<sup>4</sup>*

- *Direction* – clear direction reduces uncertainty and gives meaning to people's work.
- *Job clarity* – clear and achievable goals.
- *Client focus* – meeting clients' needs creates a sense of purpose and is rewarding.
- *Competence* – the skills and knowledge to do the job.
- *Resources* – right resources to do the job.
- *Empowerment* – sense of freedom to make choices and take control of environment.
- *Involvement* – involvement engenders commitment.
- *Cooperation* – relaxed and non-competitive working relationships.
- *Feedback* – lets people know how they are doing and what they need to learn.
- *Recognition* – the emotional side of feedback.

### HOW NOT TO DO IT

Figure 15.2 is a humorous reminder and warning about the way in which projects need to be undertaken effectively with the right leadership.

**Fig. 15.2** The boat race

MEMORANDUM

To: Whom it may concern

From: Management, Chicago

Date: May 1999

Subject: ANNUAL BOAT RACE, Lake Michigan Marina

Company A and Company B decided to have a competitive boat race on Lake Michigan. Both teams practised hard and long to reach their peak performance. On the big day they were as ready as they could be.

RESULT: Company A won by a mile.

Afterwards, Company B's team was very discouraged by the loss and morale sagged. Corporate management decided that a reason for the crushing defeat had to be found. Subsequently, a task force comprised of key executives, called the *ANALYSIS OF SUPERVISORY SYSTEMS for EXECUTIVES and SUBORDINATES (A.S.S.E.S.)*, was formed to investigate the problem and recommended the appropriate corrective action.

*THE A.S.S.E.S.' CONCLUSION*

The facts indicated that both teams had nine people involved in the contest. However the distribution of duties differed considerably. Company A's team had eight people rowing and one steering, whereas Company B had eight people steering and one person rowing. The task force concluded that it was obvious that the loss was due to poor rowing staff performance.

*THE A.S.S.E.S.' RECOMMENDATION*

To prevent this from happening next year, the person rowing the boat should work harder to be a premier performer during the next evaluation period. To reach this goal, the steerers should delegate authority and give the staff rower empowerment to do better. The rower should be placed on progressive discipline.

*RESULT OF THE NEXT YEAR'S RACE:* Company A won by two miles.

Company B's management laid off the rower for poor performance, sold the paddles, cancelled all capital investment for new equipment, halted development of new canoes and distributed money saved as a bonus to senior executives for the risks they had taken.



## QUALITIES OF A CHANGE AGENT

### *Skills*

- Technical expertise, skills and competencies (has credibility)
- Oral and written communication skills and presentation skills
- Interpersonal competence in influencing and motivating
- Decision-making capability
- Negotiation skills
- Problem-solving skills
- Leadership ability
- Teamworking skills
- Good at organizing and deploying resources
- A good project manager
- Experience, track record, maturity, rounded

### *Characteristics*

- Assertive, willing to pressure others
- Quick thinking, decisive
- Energetic, enthusiastic, committed, positive
- Mature
- Creative 'on the hoof'
- Charismatic
- Sensitive to change
- Confident but not arrogant
- Articulate and clear
- Approachable, open, good listener, sense of humour
- Logical thinker
- Adaptable, flexible, innovative
- Honesty, integrity, trustworthy, reliable and sincere
- Diligent
- Thick-skinned, tenacious, not easily intimidated
- Patient and persistent
- Politically aware

### *Leadership qualities*

The definitive quality that sets leaders apart is their ability to inspire willing followers. Leaders who inspire and deliver do not do it alone. Qualities they exhibit include:

- inspires rather than drives people;
- commands rather than demands respect;
- has a deep interest in people;
- radiates support not fear;
- depends on personality and goodwill not rank and authority;
- coaches and encourages rather than directs and bullies;
- generates other people's ideas instead of enforcing own ideas;
- is quick to understand, not to judge;
- helps people to plan to meet objectives rather than enforces deadlines;
- shows what is wrong rather than who is wrong;
- focuses on effectiveness not efficiency;
- relies on trust rather than control;
- walks the talk.

### *The art of facilitation*

#### ■ *Supporting* – listening

- clarifying
- providing equal time
- confronting distractions
- respecting 'air time'.

#### ■ *Leading* – agreeing outcomes

- focusing discussion
- managing time
- encouraging participation
- displaying enthusiasm and action.

#### ■ *Exemplifying* – providing congruence

- showing openness
- exhibiting candour with sensitivity
- walking the talk
- role playing.

- *Normalizing*
  - positive conflict management
  - even handed and unbiased
  - awareness of personal agenda
  - use of humour
  - de Bono's six hats.

**Case study 15.1**

GE

*We spend a lot of time with our people. The day we screw up the people thing, this company is over.*

So said GE CEO, Jack Welch, who receives volumes of information from multiple sources, tracking executives' progress in detail: feedback is specific, constructive, to the point. When committing to Six-Sigma quality, he confronted senior executives whose beliefs did not align with the values required and told them GE was not the place for them.

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# Business process performance management

- Introduction 2 0 1
- Process-based budgeting 2 0 1
- Objectives and responsibilities 2 0 3
- Balanced performance measures and targets 2 0 4
- Evaluation of alternative service levels 2 0 6
- Priority-based budgeting 2 0 6
- Process/activity-based monitoring and reporting 2 1 0



## INTRODUCTION

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In Chapter 2, Figure 2.2 (p. 20) illustrates the need to link the organization's value-based strategy via the balanced scorecard to operational, quality and performance management systems, which 'drill down' through the organization and include balanced measures of cost, quality and time for each process and activity. One holistic performance management system should emerge hand in hand with the development of one corporate information system. Process-based management (PBM) is the management and control of the company using P/ABT.

The P/ABT discussed in this chapter relates not to one-off initiatives like ABC or BPR, but to an ongoing planning, monitoring and control system that facilitates controlled continuous improvement company-wide. The use of one-off P/ABT to inform and reduce costs can be likened to a crash diet – weight is noticeably lost, but once you are off the diet the weight quickly returns. The need to maintain the necessary weight loss requires a recognition that a complete change of eating habits and lifestyle is required and that is what the use of PBM provides for a business. PBM is a series of related management techniques based on process/activity analysis, including:

- process-based budgeting;
- cascading of objectives and responsibilities down the organization through processes and activities;
- setting of a balanced set of performance measures and targets – cost, time and quality – for each process and activity;
- ability to evaluate alternative levels of service;
- priority-based budgeting;
- process/activity-based reporting, including earned value analysis;
- Six Sigma;
- benchmarking;
- cause and effect analysis;
- process-based accounting;
- ABC;
- BPR;
- E2E process management.

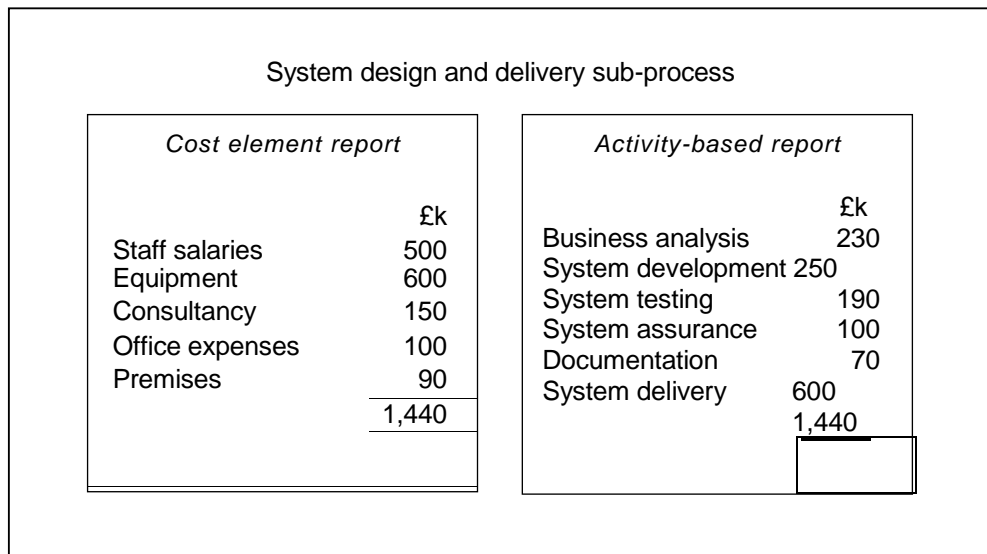
## PROCESS-BASED BUDGETING

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Having carried out the necessary process/activity analysis and fully understood how the business operates, it is then possible to plan, monitor and control the entire business based on the activities and processes that are performed. The traditional approach to

budgeting looks simply at cost elements, e.g. how many people, how much office space and how much other resource is required to run a budget centre (see the companion publication *Transforming the Finance Function* and the section on beyond budgeting, for more details on this subject).<sup>1</sup> The process-based budgeting approach allows us to examine exactly what activities are performed within the process and what resources are consumed by each activity, as can be seen in Figure 16.1.

**Fig. 16.1** Activity budgeting



By understanding not only what each activity costs to perform, i.e. what resources it has consumed, but also what outputs it produces, e.g. how many systems are being developed, enabling examination of the unit costs, quality and time measures per activity output. This effectively enables us to:

- make comparisons to other similar activities both internally and externally, i.e. benchmarking;
- set measurable objectives and responsibilities for all activities/processes (support and operational) linked hierarchically to the corporate strategy;
- set performance measures and targets for the planning period, linked hierarchically to the balanced scorecard, incorporating non-financial and qualitative measures as well as quantitative;
- set a clear link between, and vary the budget for, resources consumed in relationship to outputs produced;
- examine alternative service levels for activities and processes and prioritize their importance to the business, allowing reductions in budget to be made on a basis that relates to the importance to the business, in preference to the traditional ‘across-the-board’ cuts irrespective of the medium- and long-term effects, i.e. priority-based budgeting (PBB);

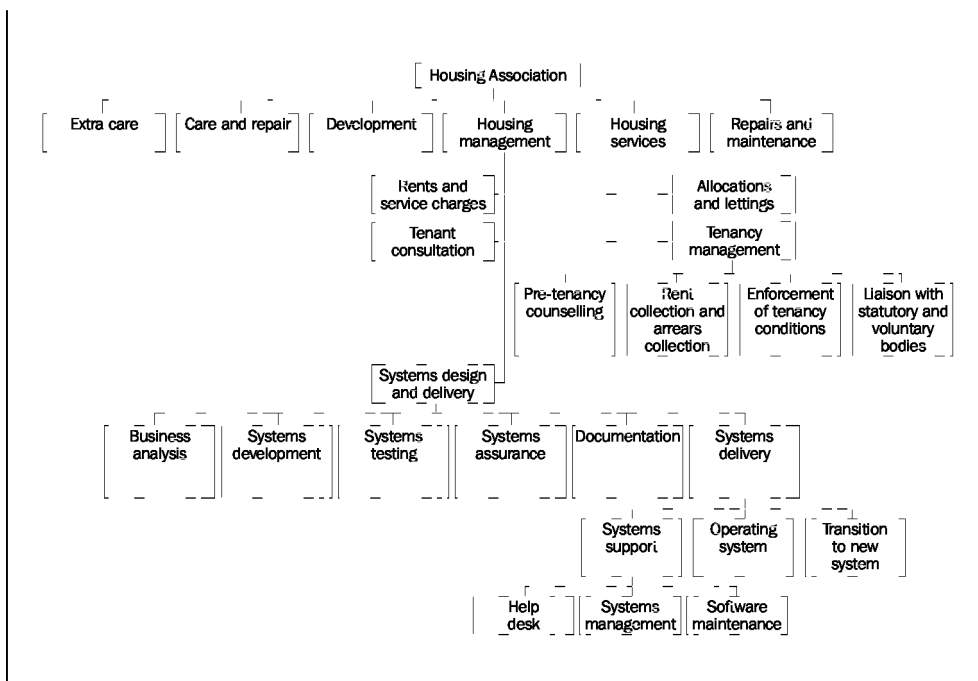


- evaluate strategic simulations using ‘what if’ scenarios within the model;
- apply quality techniques to measure and correct process variation, e.g. Six Sigma (see Chapter 17, pp. 220–22).
- use process-based accounting to leverage processes to predict results (see Chapter 17, pp. 217–20).

## OBJECTIVES AND RESPONSIBILITIES

Using the IT example, the setting of objectives and responsibilities can be cascaded down the process/activity hierarchy by drilling down in the same way as delegated or devolved budgeting would do. The only difference is that the association is against the activity and process hierarchy, not the organizational structure (see Figure 16.2).

**Process hierarchy**



□ *Level 1 – Corporate.* Objectives and responsibilities set as guidelines for the company as a whole, linked into the corporate level balanced scorecard (BSC) outcomes, critical success factors (CSFs) and key performance indicators (KPIs).

- *Level 2 – Core processes.* Objectives and responsibilities set as guidelines for each core process delivering goods and/or services to the customer, linked into cascaded lower-level BSCs. In our example ‘Housing Management’ is a core process.

- *Level 3 – Sub-processes.* The sub-processes each have clearly defined objectives and responsibilities and are again linked to the BSC. One such sub-process would be the ‘Systems Design and Delivery’ sub-process.
- *Level 4 – Activities.* Linked again in the process hierarchy. One activity would be ‘Systems Delivery’.
- *Level 5 – Tasks.* One task would be ‘Systems Support’.
- *Level 6 – Sub-tasks.* One sub-task would be the ‘help-desk’.

An example of an overall objective set for ‘help-desk’ might be:

*To support customers in the most effective and efficient manner possible.*

## BALANCED PERFORMANCE MEASURES AND TARGETS

Performance measures are the quantification of how well the activities within a process or the outputs of processes achieve specified goals. Hronec, in his book *Vital Signs*, said:

*Without performance measurement, improvement cannot be meaningful: it cannot last and only by focusing simultaneously on cost, quality and time can a company optimize its results.<sup>2</sup>*

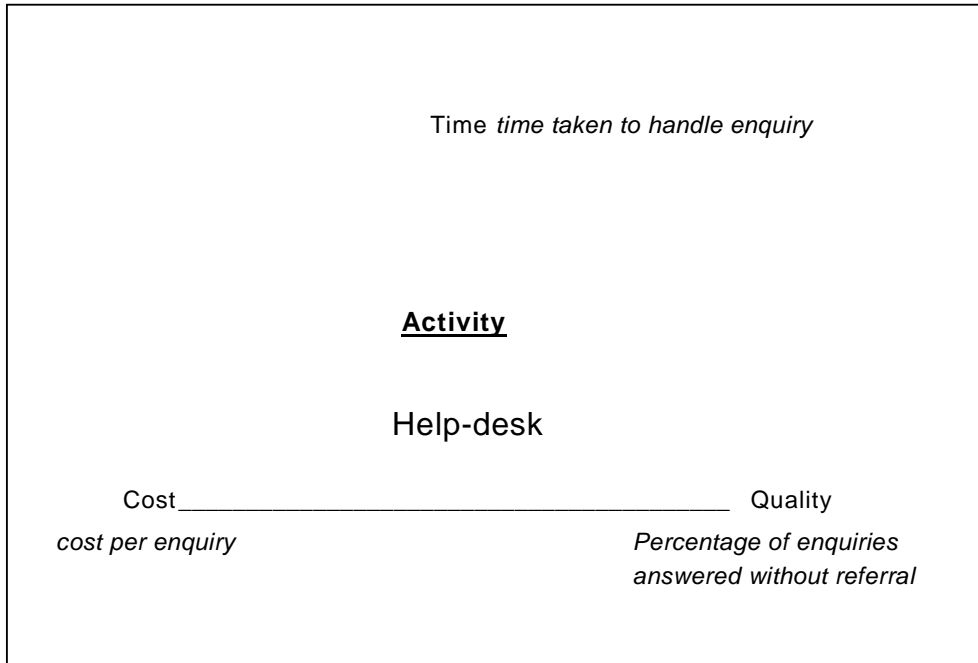
- Quality quantifies the ‘goodness’ of a product or service.
- Time quantifies the ‘goodness’ of a process.
- Cost quantifies the economics of the ‘goodness’.

Traditionally, finance would have concerned itself solely with cost, and the quality function, through the company’s quality management initiative, would equally be trying to maximize quality without due concern for the cost implications. Figure 16.3 shows how within this holistic, company-wide system each activity and process needs to be measured, not just in cost terms, but in terms of its quality and time measures, representing a balanced view. Any change in one measure will have a direct relationship on the other measures. For example, reductions in cost, all other things being equal, will result in an adverse effect on time or quality or both. The measurement of these three elements defines clearly the level of service being provided by the activity.

These measures and targets will be linked directly to the objectives and responsibilities cascaded down the organization and linked to the corporate BSC. In our help-desk example in Figure 16.3, the cost measure could be average cost

per enquiry, the time measure average time taken to handle the enquiry, and the quality measure the percentage of enquiries answered without referral.

**Fig. 16.3** Balanced performance measures



Some of the benefits of setting performance measures for all levels of activities and processes within the organization are as follows:

- It enables the level of service being delivered by the activity or process to be defined.
- It enables the customer (internal or external) to specify his or her requirements.
- It allows a baseline to be measured and any improvements or other deviations to be monitored against it.
- It allows 'best practice' to be identified through benchmarking.
- It facilitates the drive for change to achieve 'best practice'.

### Hronec's quantum performance matrix

To use as a prompt when setting process/activity performance measures, Hronec produced a matrix of the types of time, quality and cost measures that could be set:

#### *Cost*

- *Inputs* Unit cost of process inputs
- *Outputs* Unit cost of process outputs

- *Activities* Cost of performing a process/activity
- *Tasks* Cost of performing a task

#### *Time*

- *Velocity* Speed of delivery of process output
- *Flexibility* Ability of the process to respond to varying demands
- *Responsiveness* Willingness and readiness to provide prompt service
- *Resilience* Ability to change

#### *Quality*

- *Conformance* Effectiveness of a process, i.e. meeting or exceeding customer satisfaction
- *Productivity* Efficiency of a process, i.e. doing the right things in the correct way
- *Reliability* Consistency of performance and dependability
- *Empathy* Individualized attention, e.g. customer satisfaction rating
- *Credibility* Trustworthiness, honesty
- *Competence* Required skills and knowledge

It is possible to set time, quality and cost measures for any activity or process.

## EVALUATION OF ALTERNATIVE SERVICE LEVELS

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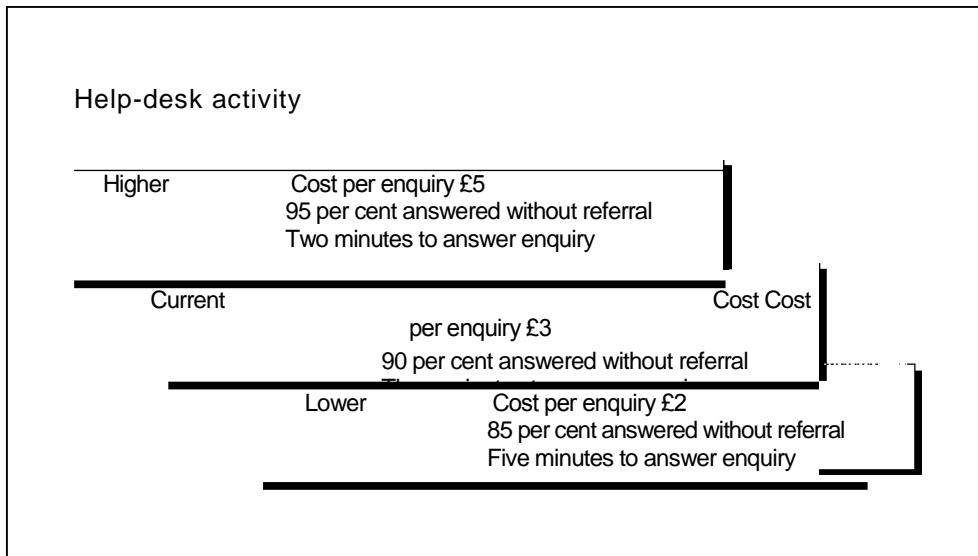
Figure 16.4 demonstrates how, once the level of service of an activity or process like the help-desk has been defined in terms of time, quality and cost measurements, alternative levels of service can be evaluated. This means that when setting budgets, measuring performance or discussing levels of required service with customers (internal or external), alternatives, where appropriate, can be clearly identified, measured and compared.

In this example of the help-desk, it can be seen that by increasing or decreasing staffing of the activity, cost and quality increase or decrease accordingly, thus providing a clearly defined choice as to the appropriate level of service for the business.

## PRIORITY-BASED BUDGETING

---

By applying a rating scale like the one shown in Figure 16.5 to the various levels of service evaluated at activity/process level, it is possible to rank the levels of service in order of importance to the running of the business.

**Fig. 16.4** Alternative service levels**Fig. 16.5** Priority-based budgeting rating scale

- |    |   |
|----|---|
| 10 | Essential to the business                                       |
| 9  | Critical – unavoidable without substantial loss or damage       |
| 8  | Very attractive, important and productive increments of service |
| 7  | Important – hard to see how they could be dropped               |
| 6  | Significant benefits, but could conceivably be dropped          |
| 5  | Desirable, but first to be dropped if funding curtailed         |
| 4  | Marginal, but first to be supported if funding increased        |
| 3  | Possible, but only if much increased funding available          |
| 2  | Doubtful – not sufficient justification at present              |
| 1  | Unlikely ever to be funded                                      |

In this way, when scarce funds are being competed for, those that are evaluated as being more crucial to the running of the business are funded first. Ranking and prioritizing of this kind have been common in capital budgeting for many years. Figure 16.6 is an example of priority based budgeting (PBB) being applied to Security. It clearly sets out the objectives and goals to be achieved by the activity. It lists the ideas for change that the team has considered as ways of improving the service, some of which it is assumed will proceed and have been included in the proposal, two of which are still being evaluated and one which has been rejected. It sets out four possible levels of service that it could deliver over the coming budget period, with their subsequent number of employees and total costs. The MOD standard is the minimum level of service possible, because the company depends on MOD contracts for its core business. It can be seen that by incorporating the

assumed changes, a higher level of service is being offered at service level 4 at a lower cost than the current budget.

**Fig. 16.6** Priority-based budget – Security

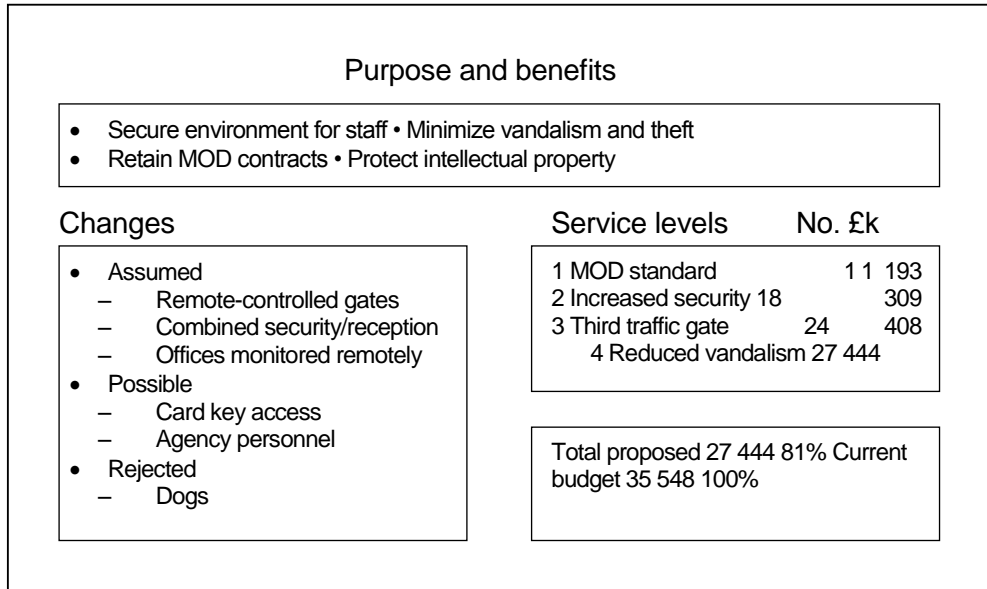


Figure 16.7 lists the alternative levels of service for Security together with the levels of service being offered by two other activities, Catering and Typing. They are ranked in order of the rating score that they achieved.

**Fig. 16.7** Ranked priority budget

Rank	Rating	Subject	Level of service	Increment		Cumulative		%
				No.	£k	No.	£k	
1	10	Security	1 Night cover	1	193	1	193	20
2	10	Catering	1 Room and hot water	1	15	2	208	22
3	9.1	Security	2 Day patrols	7	116	9	324	34
4	8.5	Typing	1 External only	7	70	16	394	41
5	7.2	Catering	2 Sandwiches and drinks	4	50	20	444	46
6	6.7	Typing	2 Important reports	5	50	25	494	51
7	5.2	Catering	3 Basic/self-service	10	120	35	614	64
8	4.5	Catering	4 Choice and service	6	85	41	699	73
9	4.2	Security	3 Third traffic gate	6	99	47	798	83

This enables the manager to draw a line in accordance with the resource that is finally allocated in the budget for these activities. For example, if it were £500,000 then everything would be funded up to and including Typing service level 2, 'important reports', but excluding Catering service levels 3 and 4 and Security service levels 3 and 4.

## Budgeting panels

The ranking of importance to the organization of the alternative service levels needs to be carried out by a group of managers who are representative of the whole organization. This is crucial to gain a balanced view. For example, if the Finance budget were being considered, it is probable that the finance manager may, quite understandably, put a higher rating score on the provision of financial information than would other members of the organization. It would depend entirely on how useful they viewed the information being provided. This process would begin a useful dialogue between internal suppliers and customers.

A budgeting panel should include:

- the overall SBU/process manager (usually in the chair);
- lower-level managers from SBU/process (as appropriate);
- managers representative of the rest of the organization, particularly from its (internal) suppliers and (internal) customers;
- the PBB project manager.

The activity/process manager would be responsible, with help from the PBB manager and line manager, for the preparation of documentation. The budget proposal would include:

- proposed activity/process budget;
- proposed objectives and goals;
- proposals for performance improvements;
- proposed performance measures and targets;
- alternative service levels, with details of their benefits and consequences;
- performance to date (unless this was the first meeting of the panel).

The security manager would attend the budgeting panel to present the proposals and answer questions directly from the panel members, prior to them ranking the alternatives and recommendations.

The panel outputs would include:

- ranked levels of service;
- performance improvements;
- performance measures and targets.

This information arms the SBU/process manager and the PBB manager with the necessary priorities when the final decision on funding is made by the company's board of directors or other final decision-making body.

## PROCESS/ACTIVITY-BASED MONITORING AND REPORTING

Monitoring and reporting in PBM is based on:

- forward-looking trend analysis;
- processes in control;
- a balanced set of performance measures at all levels;
- waste and unused capacity;
- a concentration on utilization and output volumes;
- measurement of quality and correction of deviations from process;
- service-level options as formally prioritized for the good of the business;
- an emphasis on activities and processes not functional departments;
- value-based strategy not 'last year minus';
- a focus on benchmarked industry targets;
- support for a 'bottom-up empowered' organization with a culture of continuous improvement;
- the use of technology to present in a graphical way, using trend analysis, alerts and exceptions to the full.

The activity/process analysis does not necessitate everyone in the organization collecting time-recorded information on a regular basis. In Figure 16.8 the earned value activity analysis approach can be seen in financial processing which carries out five activities where as a calculation can be made for each activity based on Actual volume ~ Budgeted cost (a standard cost approach). This approach can be compared to Figure 16.9 actual activity analysis where actual time recording and actual costs are available for each activity.



**Fig. 16.8** Earned value activity analysis

Financial processing						
Activity	Output measure	Actual output (k)	Budget cost per unit (£)	Earned value (£)	Target	
					Cost per unit	EV (£k)
Process sales invoices	Invoices	1.5	16.7	25.0	10.0	15.0
Process staff claims	Claims	1.2	3.0	3.6	2.0	2.4
Banking/cash receipts	Cheques banked	3.0	0.7	2.1	0.7	2.1
Control balance sheet	Accounts	0.5	6.0	3.0	6.0	6.0
Management	Staff	5.0	1.0	5.0	1.0	5.0
Total earned value (£k)				38.7		30.5
Actual cost				42.0		42.0
Variance				-3.3		-11.5
% effective				92%		73%

**Fig. 16.9** Actual activity analysis

Financial processing						
Activity	Output measure (number of)		Volume	Cost (£k)	Cost per unit (£)	Target cost per unit (£)
Process sales invoices	Invoices	Budget	1.5	25	16.7	10
		Actual	1.5	27	18	
Process staff claims	Claims	Budget	1	3	3	2
		Actual	1.2	3	2.5	
Banking/cash receipts	Cheques banked	Budget	3	2	0.7	0.7
		Actual	3	3	1	
Control balance sheets	Accounts	Budget	0.5	3	6	6
		Actual	0.5	3	6	
Management	Staff	Budget	5	5	1	1
		Actual	5	6	1.2	
TOTAL		Budget	38			
		Actual	42			





**Metropolitan Housing Trust**

*Background*

Metropolitan Housing Trust<sup>3</sup> (MHT) operates out of four regions, three in London and one in the Midlands. Senior management wanted to look at the relevance and cost effectiveness to MHT of PBM by undertaking an exercise to look at the administrative process from receipt of a maintenance fault notification to the payment of the invoice, referred to for this exercise as the 'reactive repair process'.

A new housing-specific software package had been installed by MHT about a year prior to this project being undertaken. This software was designed to enable properties to be viewed online while calls from tenants were in progress. A methodology for using the new system was agreed and all regions were trained. The objectives of the exercise were agreed as follows:

- Map the 'reactive repair process' (RRP) and identify any differences between regions.
- Cost the activities within the process.
- Examine quantitative and qualitative performance measures for the process.
- Hold workshops to discuss analyses and identify improvements and best practice.
- Review external influences and support activities.
- Benchmark the process with another housing association, Northern Counties, based in Manchester, which uses the same software package. (This objective was added during the project to enable a better understanding of the problems being experienced with IT performance.)

*ABC*

A member of staff built an ABC model using a spreadsheet package, determining the costs, of the activities within the process (see Figure 16.10), for each region (see Figure 16.11), and for costs per order and stock unit (see Figure 16.12).

**Figure 16.10** MHT - RRP activity costs

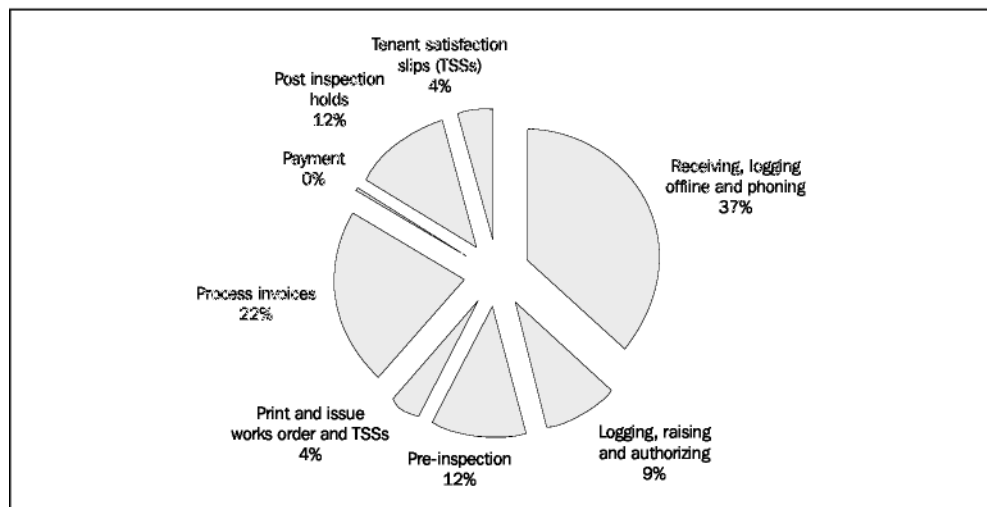


Fig. 16.11 MHT – RRP regional activity costs per order

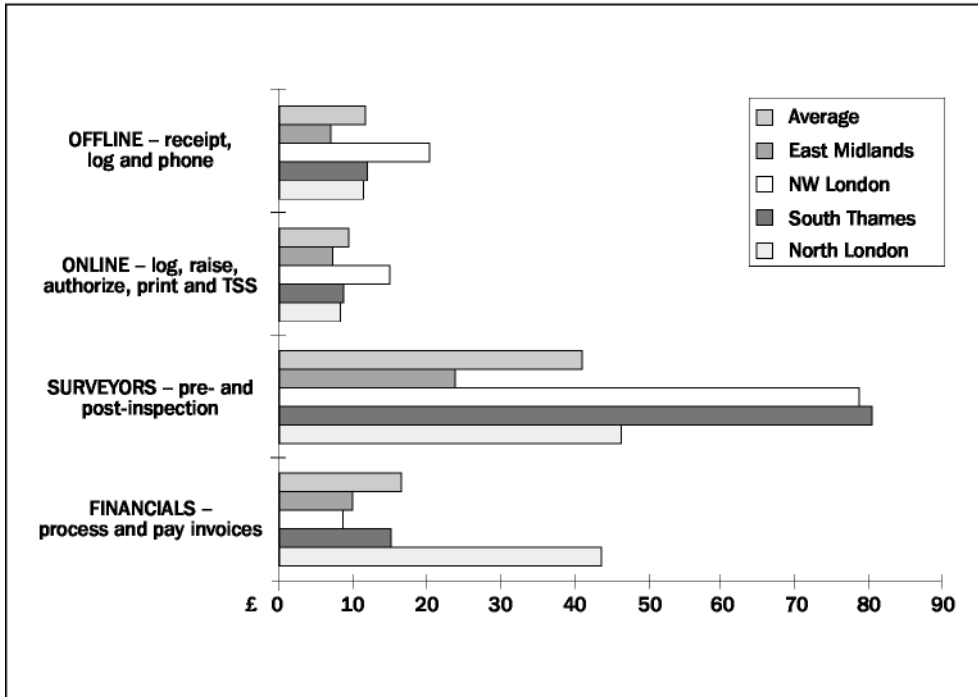
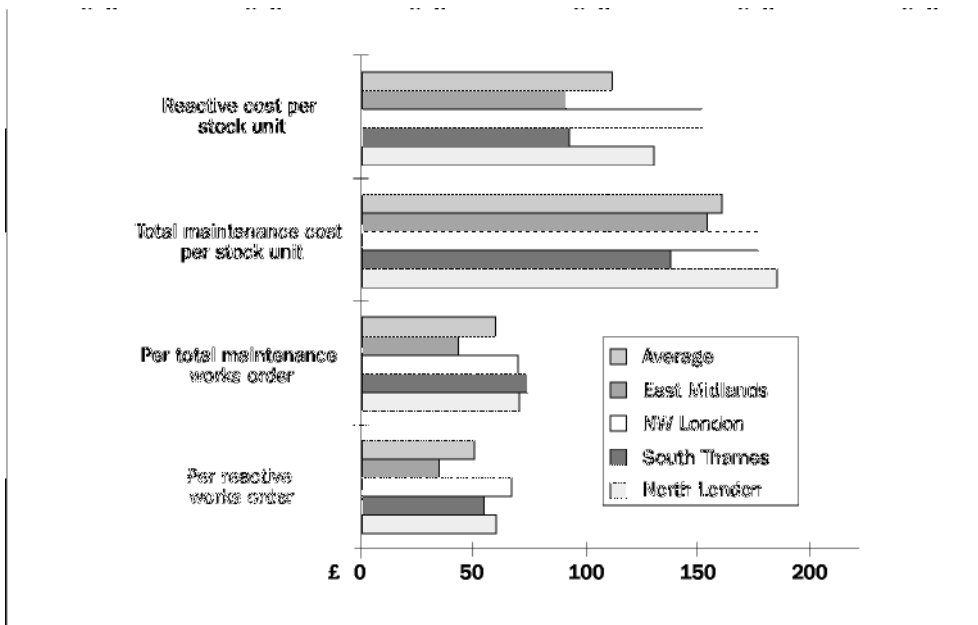


Fig. 16.12 MHT – average costs for repairs and maintenance administration



This information made MHT aware that the administration of each reactive repair order was costing about £50, which, when multiplied by the number of average repairs per year per stock unit, equalled about six weeks' rent. This useful ABC data was available to inform and influence the future operational management of the process.

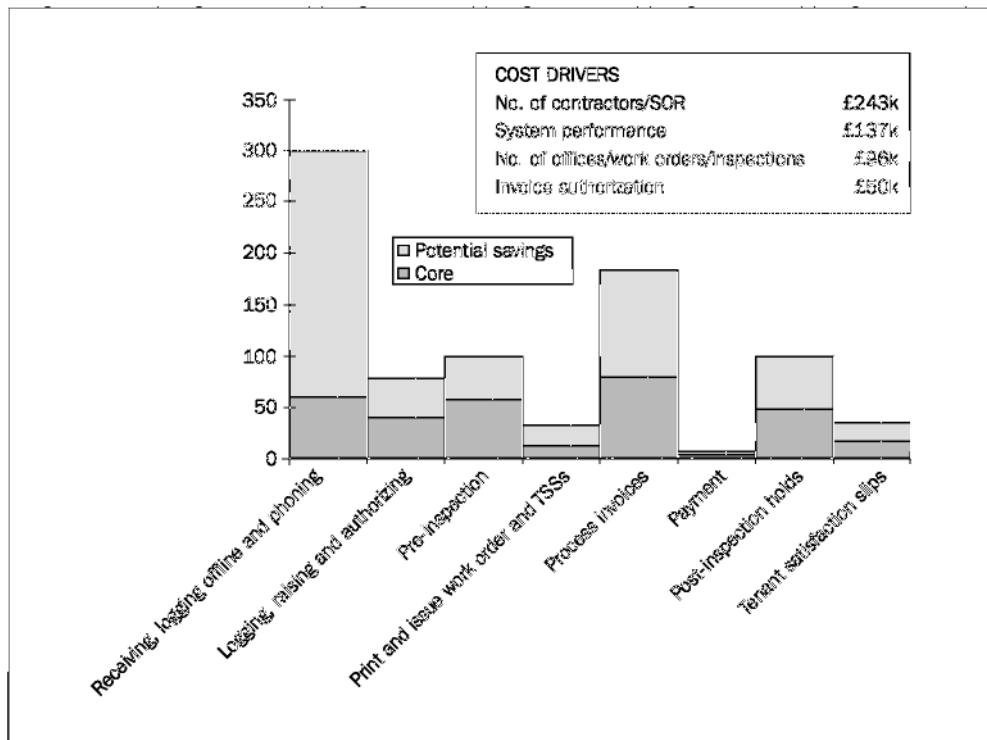
*BPR and benchmarking*

The mapping of the processes in each region revealed a number of different practices, which proved beneficial input to the best-practice workshop. The one main common problem that all regions were experiencing was the failure to be able to operate online when tenants phoned in. It was as a result of this that the decision was taken to benchmark with another housing association which used the same software package, with the aim of identifying the cause of the problem. A one-day benchmark visit was organized and a report prepared for both parties, which compared:

- general information about the size, geography, etc. of the organizations;
- maps of the 'reactive repair processes' of both organizations;
- the organizational structures and practices for repairs;
- IT hardware, software and practices.

From the ABC, BPR and benchmarking information, the main influences on cost, i.e. cost drivers, were identified as well as the potential savings if all of the possible changes were put into place (see Figure 16.13).

Fig 16.13 | MHT – RRP cost drivers



All of the information and consideration, including:

analyses were input into the best-practice workshop for

- external benchmark data;
- costing data;
- regional analyses;

- ideas for improvements, identified from all involved in the process. These included suggestions relating to those departments that interfaced with the process, such as Finance and IT.

Attending the workshop were staff and management from the processes in each region and representatives from the interfacing departments, enabling all issues to be discussed, including the external benchmark data.

#### *Balanced performance measurement*

However, to stress the importance of not just looking at cost information in isolation, a series of balanced performance measures needed to be examined as well as the obvious social considerations of such an organization taken into account. These included the following:

- *Cost measures:*
  - \_ per call received
  - \_ per works order raised per
  - \_ inspection carried out per
  - \_ invoice processed per
  - \_ payment made
  - \_ per repair carried out
  - \_ per stock unit.
    - *Time measures:*
      - time taken to answer phone calls –
      - time taken to carry out inspections – time
      - taken to carry out repairs – time taken to
      - pay contractors – time taken to process
      - invoices
      - time taken to set up new contractors – time
      - taken by system to process fault.
- *Quality measures:*
  - tenant satisfaction
  - percentage of inspections carried out
  - percentage of inspections that proved unsatisfactory
  - percentage completed within priority levels
  - percentage of errors made on payments
  - Number of repairs per stock unit.

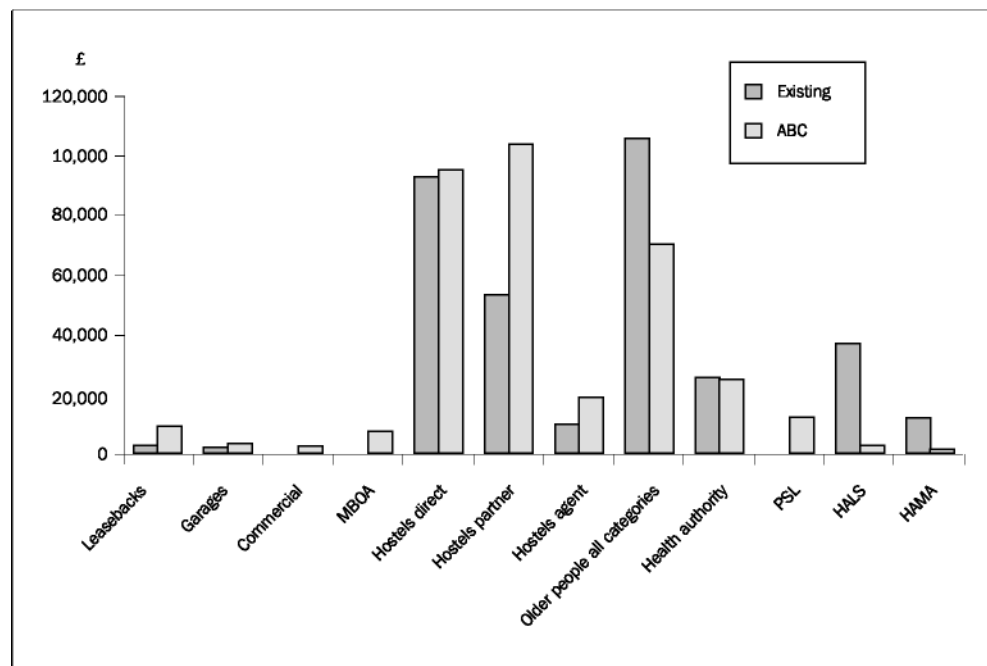
#### *Activity-based budgeting*

Because this was a pilot project, information needed to be collected from all of the support processes and decisions taken on how the costs should be allocated to the RRP, which had been ring-fenced for the exercise. These included costs from all the head office departments and some regional overhead costs. The traditional costing/budgeting system allocated central

overheads to regions based on the number of housing units or on staff numbers. These central costs were then added to the regional overhead costs and incorporated as a percentage oncost into the estimate of time spent on each housing type made by all direct employees.

The ABC/ABB methodology took the average cost of each repair and multiplied it by the number of repairs that actually took place in each housing type, scheme, region. This information was readily available in the housing software. *See* Figure 16.14 which compares the traditional and the activity based approaches for the repairs and maintenance budget.

**Fig. 16.14** MHT – repairs and maintenance budget: traditional versus ABC



Equally, if applied across all of MHT's processes, then these differences would occur differently in each process – voids, arrears, applicants on waiting lists, allocations and tenancy management. Each of these processes would show a different pattern in different housing types and areas. This provides significant information for housing associations which are bidding to take over other properties.

#### Conclusion

The main benefits of the exercise were identified as:

- allowing the complexity of maintaining provision to be costed thus informing future housing strategy;
- mapping of processes and procedures allowing best practice to be ascertained, benchmarked and maintained;
- examination of activity costs by region, allowing more informed operational decision making;
- assignment of budgets and performance measures to activities within the process, allowing alternative service levels to be evaluated and ongoing performance monitored.

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## Process-based accounting incorporating Six Sigma

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## INTRODUCTION

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Jim Brimson in his book *The Handbook of Process-Based Accounting: Leveraging Processes to Predict Results*<sup>1</sup> brings together all of the elements of process-based management and other accounting and performance measurement tools and techniques, including Six Sigma, into one all-encompassing predictive accounting framework.

## FORWARD-LOOKING CHARACTERISTICS OF PROCESSES

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- *Flow* – sequence of activities within a process.
- *Resource consumption* – average amount of resources consumed in producing one unit of output.
- *Cycle time* – time taken by the process to transform an input into an output.
- *Effectiveness* – how well a process meets its cost and performance targets.
- *Storehouse of value* – value inventory created for future operations.
- *Process value creation* – gauged by the excess of lifecycle revenue over cost.

## TEN BOTTOM-LINE MANAGEMENT GUIDELINES FOR PBA

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- *Before one can improve performance, one must improve the process.* BPR and progress monitoring.
- *PBA proactively focuses management attention on processes.* Outstanding performance requires:
  - sustained effort;
  - constancy of purpose;
  - an environment where continual improvement is the operating philosophy.
- *Predictive ability is directly related to process variation.* It is necessary to incorporate Six Sigma techniques to minimize process variability and maintain process stability.
- *Control charts are a superior tool in interpreting financial results.* The control chart approach concentrates on the behaviour of the underlying process, while variance analysis tries to attach meaning to each specific actual to budget comparison. Control charts are comprehensive and yield more insight and greater understanding than variance analysis.
- *The process model must use statistics to anticipate, rather than forecast, future events.* A forecast is based on historical trends and patterns, while understanding

the key events that disrupt the processes enables adjustments to minimize the impact of events.

- *Product/service features are a source of process variation.* Process variation includes normal random (systemic) and problem-induced variation. Systemic variations which result from the whole process are often uncontrollable, while problem-induced variations are largely controllable.
- *Capacity affects process cost.* Getting the correct capacity is critical to achieving target cost. Too little capacity creates bottlenecks, while too much capacity results in wasted resources.
- *PBA obligates managers to strive to totally eliminate process variation.* Six Sigma, TQM, lean manufacturing, ERP, computer-integrated manufacturing, productive maintenance and reliability engineering all strive for zero defects, reduced time, labour or failures as their goals. Support processes must also strive for precision.
- *PBA adds a process foundation.* The management system should be based on a systematic, fact-based process that collects and analyses a variety of information.
- *PBA is based on objective and verifiable information.* PBA is based on hard facts including:
  - the sequence of the order and timing of activities – process maps;
  - the repeatability of activities;
  - the degree to which a process is in control;
  - the significant few problems, following Pareto’s 80/20 rule, that management must focus on using root cause analysis.

## STEPS FOR IMPLEMENTING PBA

- 1 Conduct activity analysis.
- 2 Develop activity standard costs.
- 3 Assess process variation and conduct root cause analysis.
- 4 Identify process performance measures.
- 5 Identify external value drivers.
- 6 Assess the planned workload using key event planning tables.

## STEPS FOR OPERATING PBA

- Track actual workload.
- Track actual cost incurred by the group.

- Compute earned value cost.
- Compute earned value variance.
- Assign the earned value variance to individual activities.
- Track earned value variance on a control chart.
- Interpret earned value results.

## A PROCESS-BASED PERFORMANCE MEASUREMENT FRAMEWORK

Processes should be the foundation of a performance management system. The resulting framework would incorporate a balanced scorecard and strategic performance measurement principles (*see Transforming the Finance Function* for more details of these tools)<sup>2</sup> and integrate a wide range of other management tools, such as ABC, BPR, Six Sigma and TQM. A process affects results in two ways:

- The totality of the interconnections of all processes creates enterprise-wide performance result.
- Each individual process has its own unique performance outcome.

### Process-based performance measurement principles

- *An in-control process delivers consistent and predictable results. A performance measurement system should never measure the results of a process. Use control charts for the process and each of its main activities – these instantaneously detect problems and point to their root causes, enabling immediate corrective action.*
- *Performance targets are what the customer or executive team wants performance to be. A process can deliver performance only within certain limits depending on its capabilities. The two must be reconciled.*
- *Performance measures should assess whether the desired outcome of a process is being achieved. A performance measure assesses progress relative to predetermined goals or objectives.*

### Improving predictability with control charts

Performance results are directly related to the stability of the process, which is directly related to:

- measurements of the amount and distribution of process variation;

- detection of signals rather than random noise by using control charts;
- identification and elimination of the cause of process variation;
- continuous improvement of stable, in-control processes;
- identification of key events that might disrupt a process.

## THE SIX SIGMA WAY

The quality initiative Six Sigma is sweeping the US among business leaders on a quest for operations performance improvement. For peak performance, companies should assign process owners and position Six Sigma as one tool in the context of a holistic and strategic business process management approach, which would incorporate BPR, PBB, CRM and BSC among others tools and techniques. Pande Nueman in *The Six Sigma Way* says:

*Whether designing products and services, measuring performance, improving efficiency and customer satisfaction – or even running the business – Six Sigma positions the process as the key vehicle of success. Research has shown that the costs of poor quality (rework, mistakes, abandoned projects, etc.) in service-based businesses and processes typically run as high as 50 per cent of total budget.<sup>3</sup>*

Six Sigma is a measurement of standard deviation.<sup>4</sup> A manufacturer with a process operating at a level of *Three Sigma*, which is the average for US corporations, has about 65,000 errors per million opportunities. Motorola, which developed the concept in the 1980s, was still hovering at around 5.8 defects per million on average in 1998. It differs from an old-style total quality programme because the ultimate measure is whether operating margin is improving. The results deliver higher quality at a lower cost. Six Sigma is based on facts and starts by training and equipping quality teams to perform rigorous data gathering and statistical analyses that unveil the root causes of defects. The teams are then trained to deliver solutions that will eliminate the causes of error, whether they are products that do not work, distribution channels that stall or a slow response to customer requests.

## KNOWLEDGE TRANSFER SYSTEMS<sup>5</sup>

An integrated knowledge management system is more effective from a process-improvement, decision-support, training and risk-management perspective than just a focus on storing and accessing information in a central repository.



Integrated knowledge has:

- *structure* – it is process-centric;
- *links* – it integrates parts into a dynamic, cohesive whole;
- *relevance* – it is meaningful to the execution of the task in hand;
- *accurate delivery* – required in a time-critical environment.

The transformation cycle begins with:

- *Instruction* – capturing instructions or leveraging existing information is the first step towards transforming tacit knowledge and experience into explicit knowledge, which can be mined and shared across an organization in the form of process-based best practices.
- *Action* – decision support information must be based on the most up-to-date and approved knowledge. While web portals and content management tools make information more accessible, process-centric knowledge must be organized in a task-specific actionable hierarchy.
- *Measurement* – a structure that is bound to both the process and the customer provides the basis for responding to warning signals or problems.
- *Collaboration* – to improve the process at task and cross-functional level.
- *Transformation* – provision of best practice-based decision support and training plus ongoing improvement of processes.

## Benefits

- Reduce the learning curve throughout the process.
- Support performance of employees.
- Focus on performance measures to improve processes.
- Improve customer satisfaction.
- Share ideas.
- Leverage best practice combined with continuous improvement.

### Case study 17.1

#### GE Six Sigma<sup>6</sup>

The reason behind the introduction of Six Sigma was to improve processes so that GE would not have to spend \$7 billion of its revenues each year on scrap, rework and error resolution. GE was operating at slightly better than average Six Sigma, with the average process generating less than 3.4 defects per million opportunities. However, Jack Welch pointed GE squarely at the Six Sigma goal – which can be viewed as 99.999 per cent perfection – and



vowed he would attain it before he retired at the turn of the century. Any manager who failed to undertake Six Sigma training during 1998 had to forego promotion into the top executive ranks. Beginning on 1 January 1999, all professional employees will have started training.

The programme contributed more than \$300 million to the company's 1997 operating income, helping to propel the operating margin above 15 per cent. In 1998 the company invested more than \$450 million in Six Sigma projects to reap cost savings or revenue enhancements, worth about \$1 billion during the year. The projects involve cross-functional teams lead by what GE calls Black Belts – full-time quality gurus who have been trained by Master Black Belts to drive out defects. Green Belts are project team members who also occupy their usual full-time positions.

Finance Green Belts help design performance measurement frameworks, and collect, monitor and audit savings. The savings drop back to the bottom line by allowing the business that found the savings to consume them. People are rewarded for capturing future savings, but also for getting real cost savings that they can re-use immediately.

The savings are categorized as:

- cost avoidance;
- reduced investment;
- cash flow.

An example success story was the plastics division, which essentially created a free plastics plant which would have cost \$400 million to build – by adding 330 million lb. weight of production capacity.

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# Executive summary

## Introduction

1. A true e-business is one which thinks and acts in a way that allows it to collaborate, integrate and empower by:
  - internal and external business processes working together seamlessly, enabling collaboration with suppliers, partners, employees and customers across traditional enterprise boundaries;
  - companies ensuring that employees have at their fingertips the information, applications and services they need to do their jobs.
2. It is the Web and the applications, standards, tools and services that have been developed around it that has removed the traditional barriers to building collaborative relationships and that has now made this an economically attractive option.
3. A joint survey released in May 2002 by KPMG and the CBI reveals that 90 per cent of companies believe e-business will reduce costs by at least 10 per cent but only 15 per cent are currently reaping the rewards. Improving business processes alongside new technology could boost profits of UK companies by £4.3 billion a year according to the Gartner Group, who quote Easyjet and Tesco as examples.

## PART 1 THE STRATEGIC BENEFITS OF COLLABORATIVE WEB-ENABLED BUSINESS PROCESS MANAGEMENT

### 1 The strategic benefits of business community integration

4. The roots of automated business trading links can be found more than 20 years ago with electronic data interchange (EDI). At the same time the move towards closer collaborative trading relationships began when Proctor & Gamble who prototyped ‘continuous replenishment’ with Wal-Mart. P&G’s success is attributed to:
  - the importance of a trusting business relationship with your counterpart;
  - the necessity of having senior management support;
  - the challenge of changing the customer’s culture as well as your own;
  - the move from continuous replenishment to collaborative planning, forecasting and replenishment (CPFR).

5. Today, with the move towards greater collaboration and increased outsourcing of both core and non-core activities companies are becoming virtual organizations – a combination of organizations working together in close partnership, with shared risk and reward, to deliver end value to customers. In 1978 the average book value of financial and physical assets was some 95 per cent of market value; today it is nearer 20 per cent with the other 80 per cent deriving from intangible assets.
6. The forming of partnerships is increasingly important. Companies need to decide the options for the extent and control of the supply/demand chain process. Losing control of the process does not preclude the ability to exert strong control over the outputs of the process.
7. Equally important is the complete change in culture and organizational structure needed. Corporate structures at the start of the twenty-first century look very different, with process management dominating, operational departments set up as strategic business units (SBU) and back-office functions often incorporated into shared services centres (SSC).
8. Cisco owns only 2 of its 40 manufacturing operations – the rest are run by partners. It owns the designs and software that controls its products; the rest are in the hands of its manufacturing partners and resellers. This makes Cisco as near as you get to a virtual corporation, yet it is the third most valuable company in the world today.

## 2 E-business strategy

9. Organizations involved in B2C marketing must be able to know that the item being ordered is in stock and can be delivered in a short time-scale. This ability is very attractive to any business, particularly when it brings with it massive processing cost reductions, improved productivity and satisfied customers.
10. ERP and integrated middleware systems are now being linked to front-office customer relationship management (CRM) and supply/demand chain management (S/DCM) packages, which have automated these processes and produced even more strategic and operational efficiency and information for decision-making purposes.
11. In the public sector e-business activity is driven by the government, which has decreed that by 2005 100 per cent of delivery of services will be by electronic means. The solution must improve the service to the citizen and reduce costs.
12. Research by AMS found that the majority of companies are approaching enterprise integration on an ad hoc basis. They estimate that 30 per cent of

integration budgets are being wasted as a result of inefficient practices; 34 per cent embark on projects without quantifiable objectives; 40 per cent cannot specify when projects will pay back; and less than 40 per cent have a corporate team in place to coordinate implementation.

13. Research has shown that there is no automatic correlation between the amount of money spent on IT per employee and company profitability, although if done well spectacular results can be achieved. Companies must insist on quick payback times, thorough business plans and careful, regular pre- and post-implementation analyses of all major technology projects.
14. The balanced scorecard approach can be applied in a matter of days, providing the company is clear on the knowledge level and understanding of the project is sound. If it takes longer then it is because the company is unable to clearly define issues regarding project scope, business strategy, market climate or departmental alignment.
15. Application service providers (ASP) rent out hosted applications over the Web, managing the servers, network connection and other equipment required in a dedicated and secure Internet data centre. ASP enables a business to have access to applications that would otherwise be too costly to implement and run on an affordable rental basis.

## PART 2 TECHNOLOGICAL, FINANCIAL, LEGAL AND RISK MANAGEMENT CONSIDERATIONS

### 3 Web-enabling technology

16. The Internet provides the communications network and the standard mechanism for exchanging and publishing information on it is termed the World Wide Web (www or the Web). The Web is accessed through a web browser which displays web pages of embedded graphics and standard document formats such as HTML and XML. All Web interaction is charged at local rate.
17. A typical large company has 30–50 separate applications which are not integrated. The situation is exacerbated by an urgent need to connect to customer and supplier systems. With wholesale replacement of systems often a non-viable solution, Web standards and services and enterprise application integration (EAI) middleware are providing an automated, cheap alternative to labour-intensive point-to-point integration.

#### 4 Mobile and wireless technology

18. Wireless means transmitting signals over invisible radio waves instead of wires. It is used from something as simple as making a phone call to the complexity involved in enabling the sales force to access information from an ERP application. It means new, more convenient ways of staying in touch with suppliers, customers and employees.

#### 5 Electronic invoicing and payments

19. Electronic transactions and payments began with EDI. Interactive web browser based solutions that require only a web browser and Internet connection at the customer end are less expensive. The EU directive which comes into force on 1 January 2004 permits companies in member states to use digital invoices rather than paper-based ones for tax and regulatory purposes. B2B and B2C invoicing and payment systems are examined as well as e-treasury.

#### 6 Statutory and risk management considerations

20. Directors now find themselves responsible for: evaluating risks to the IT infrastructure; guarding against unauthorized access to client and employee information; their servers being used to harbour offensive material; their systems being corrupted; and from third parties when servers are hijacked without their knowledge and used for denial-of-service (DOS) attacks on other sites. So it is not surprising that companies are becoming attuned to the idea that infrastructure security is an essential cost of doing business.
21. There is a need for a sound, dynamic security policy which is embedded in the corporate culture, combined with an ongoing risk assessment and mitigation process, including business continuity, in addition to the more obvious physical and technical tools such as firewalls. The challenge is to achieve maximum functionality within an entirely secure environment by including security in the design.

### PART 3 END-TO-END BUSINESS PROCESSES

#### 7 Enterprise resource planning

22. ERP vendors have redesigned their products into easily integrated components that allow the use of other components as well. The strength of global ERP

products is that they are needed to provide a firm foundation on which to build on other products to achieve the desired BCI.

23. Service process optimization has grown out of the need for services-based organizations, both internal and external, to fully exploit their capacity to change and evolve in today's dynamic business environment. They have more natural flexibility than manufacturing or supply chain operations and this leads to a very different set of systems requirements and approach to systems development to that of ERP.
24. Document management now aims to challenge the amount of documentation being received and consider how and if it needs to be stored electronically. Workflow systems can be designed to deliver specified data periodically to selected people, automatically routing electronic documents and enforcing procedures written into a process.
25. The RNLI case study demonstrates how an entire ERP suite of SAP R/3 can be implemented in nine months, coming in on time and within budget.

## 8 Business to employee

26. An increasing number of companies are seeing the benefits of employing a self-service approach to HR, i.e. relying on corporate intranets and web-enabled software to deliver documents, benefits information and company data directly to workers. Hunter Group research shows that typical selfservice HR initiatives pay for themselves in about 18 months.
27. Increasingly, corporations are going online to fill management-level positions. The Net enables employers to trawl through an enormous pool of talent much more quickly with exponentially more prospects than traditional headhunters can contact, hirers can put jobs up on specialized boards to reach qualified and interested candidates and it is considerably cheaper.
28. Corporate use of the Internet to deliver training via virtual instructors makes sense. Distance learning cuts the costs of both delivering and attending training, but it lacks human interaction and is being used by companies to supplement rather than completely replace traditional learning.
29. There is an appreciation of the need for a process-oriented, enterprise-wide decision-support system and an urgent demand for its implementation to enable companies to maintain their competitive advantage. Wal-Mart has 4,457 stores, 30,000 suppliers and an annual turnover of \$217 billion and just one information system (IS).
30. The problems associated with data consistency and quality of different merged systems can be assisted by semantics-based integration tools, which are considered a kind of middleware that thinks, because they utilize a

combination of natural language analysis, pattern recognition, artificial intelligence and other leading-edge cognitive technologies.

31. Content is an integral part of the business and is a product of every application and should be managed from a single repository as part of the infrastructure. What the technology industry is offering is better ways to share information in chunks, remotely, but in a structured way. Sitting on top of existing technologies such as ERP, workflow and document management is the corporate portal – a simple personalized Web environment offering one view of all data and information sources. Content management functionality is now being embedded into portals, like mySAP Enterprise Portal.
32. Martin Butler believes that two-thirds of the value of large companies is made up of information and knowledge and to overlook this issue is to devalue the business.

## 9 Supply/demand chain management

33. When products are produced and then pushed to customers it is a supply-led chain; when the customer is involved in specifying the products to be produced, it is a demand-led chain. The demand chain (DC) focuses all its resources on consumer demand, involving a radical change in thinking that takes the company, its SC partners and its systems into a new business environment.
34. Building an e-commerce S/DC not only requires integration with back-office finance and payment systems, but equally all along the value chain to suppliers and their suppliers. There are five basic components for S/DCM: plan, source, make, deliver, return. At each stage, monitoring and measurement systems need to be put in place to provide information for all parties to the chain and to monitor performance, efficiency and effectiveness.
35. The S/DC in many organizations can consume well over 50 per cent of a company's operating expenses, so it is an obvious area to explore and exploit in the search for business systems improvement. It is unlikely to be possible to move the entire S/DC to the Internet at one time so it may be necessary to have a strategy of phased implementation starting with the areas where the greatest impact and ROI can be achieved.
36. Product lifecycle management covers everything from now well-established mechanical CAD software to new web-based tools allowing non-engineers access to 'lite' versions of 3D data. Collaborative product commerce and visualization software help companies plan factories and production digitally. Companies that have been using digital mock-up software, reducing the need for physical mock-ups or prototypes, can now use the Internet to give all their suppliers access to the digital data.

37. The challenge for logistics is to deliver the promise made to the customer and allow customers to track deliveries while in progress.
38. According to McKinsey research, just 15 per cent of all websites accounted for 85 per cent of all revenues. The best companies' websites make it easy to buy and easy and secure to pay, with web pages downloading quickly and 95 per cent of orders delivered on time, e.g. Tesco and Amazon. With e-commerce, companies only have one chance to win and keep a customer.
39. Organizations seeing eBay's success are moving into B2C online auctions, e.g. Dell, Microsoft, and more than 100 other companies have linked their websites, along with 46 million users, to a new auction platform run by FairMarket.

## 10 E-procurement

40. E-procurement is the electronic acquisition of goods and services, which can include any stage from identifying the needs for goods through to contract management. It works upstream in the S/DCM process and covers the five rights of purchasing: price, time, quality, quantity, source. Tangible benefits can be assessed in three broad areas: transactional efficiency, supply market management and supply chain restructuring e.g., Microsoft's average transaction cost dropped from £145 to £5.
41. There are three models of approach to links with suppliers:
  - *Buy side* – a many-to-one trade transacted via the buyer's website, who has responsibility for maintaining data.
  - *Sell side* – a one-to-many trading relationship carried out via the supplier's website, with the supplier having responsibility for maintaining data.
  - *E-market* – a many-to-many trading relationship with multiple buyers and sellers brought together by an online intermediary. This allows companies to exchange information, source products and services and execute online transactions, through online catalogues, hubs and auctions.
42. There are three main types of B2B exchanges:
  - *private trading exchanges* (PTX) – owned and run by one company to manage its own trading-partner relationships, e.g. Cisco, Dell and Volkswagen;
  - *independent exchanges* – a many-to-many network, which can be either *vertical* (IVX) connecting many buyers to many sellers in a vertical market segment or *horizontal* (IHX) connecting buyers and sellers in any industry;
  - *Consortium trading exchange* (CTX) – bringing together major industry players seeking to reduce transaction and product costs and speed up the delivery chain, e.g. Transora, Covisint.

- 43. Open standards are used to increase interoperability between systems as well as interconnectivity because everyone is exchanging consistent, standardized content.
- 44. The Unilever case study explains how the e-procurement project is expected to contribute substantial savings through effective leverage of size and scale enhanced by common business processes and simplification of complexity. Unilever has recognized the importance of implementing a global supply management programme focused on non-production items.

## 1 1 Customer relationship management and e-marketing

- 45. CRM is about transforming an organization to become customer-centric and customer-facing in all that it does. It is about a change in culture that switches the emphasis of, for example, fulfilment from looking inwardly at what suits manufacturing and the supply chain to satisfying the company's external promises about service and delivery. Successful CRM is about giving the customer a better experience, hence enhancing the company's chances of retaining the lifetime value of that customer and acquiring new customers.
- 46. The CRM process can be split into three stages and involves both online and offline techniques: customer acquisition, customer retention and customer extension.
- 47. The application of technology to achieve CRM is a key element of any e-business. CRM applications cover three broad categories: marketing automation, sales process automation and customer service automation.
- 48. Marketing is responsible for identifying, anticipating and satisfying customer requirements profitably and the different stages that should be involved in an e-marketing strategy are: situation analysis, objectives statement, strategy definition, tactics, action and control.

## PART 4 HOW TO ANALYSE, RE-ENGINEER AND MANAGE BUSINESS PROCESSES

### 12 Business process analysis

- 49. Process/activity-based techniques (P/ABT) are now widely used and fall into three main categories: costing, performance improvement and performance management. Over the past decade, P/ABT have stopped being used as one-off



techniques and have become a company-wide, all-embracing, advanced planning, monitoring and control system, incorporating quality initiatives like Six Sigma.

50. All P/ABT involve analysing the business to gain a greater knowledge of what activities it performs and how those activities relate to one another to form processes. This process-based analysis then forms the central database, which can be utilized by all P/ABT.
51. The Anglian Water case study examines the company's design methodology, using a process-based business intelligence tool, building detailed business unit models and merging them to form a corporate model. The software was selected because of its suitability to be used as an end-user information delivery system, with interaction capabilities.

### 13 Activity/process-based costing

52. ABC is now accepted as the most appropriate method of costing company processes, products and services. The main difference between ABC and traditional costing is that, instead of collecting overhead costs into one or more central pools to be allocated arbitrarily to all processes, products and services, it first allocates resources to activities, prior to allocating to processes, products and services based on actual usage.
53. The fourth dimension of the ABC model provides customer/market/sector/process profitability, by multiplying product and service costs and revenues by the volumes of sales to each customer and attaching any customer- or market-driven costs directly.
54. In 1999 the government announced its plans to meld all the logistics and support services for the country's Armed Services into one body called the DLO, its motive being to reduce its £4.6 billion annual operating costs by 20 per cent by 2005, without reducing any services provided by its 43,000 staff. It is using ABC to achieve this.

### 14 Business process performance improvement

55. Early activity-based cost management performance improvement initiatives based on functional responsibilities have now given way to business process re-engineering (BPR), focusing on processes and constraint removal, not departments and functions.
56. In the ABB case study, the objectives are to cost and price products better; to enable better management through insights into activities; to use ABC as a tool for change management; and to facilitate strategic decision making.

## 15 Change management

57. In the twenty-first century change is a constant. For organizations which manage change skilfully, it can become the driving force that perpetuates success and growth, with every change presenting a new opportunity to increase efficiency or to build the business. But all too often change fails as companies do not rise to the challenges it brings.

## 16 Business process performance management

58. The need for one integrated performance management system that links strategy via the BSC to a detailed model of the organization, incorporating objectives and balanced measures for time, quality and cost cascaded down the process hierarchy throughout the organization, is now well understood (*see* Figure 2.2, p. 20).

59. This chapter examines P/ABT including activity-based budgeting; cascading of objectives down the organizational processes hierarchy together with balanced performance measures and targets; the ability to evaluate alternative service levels; priority-based budgeting; and process/activity reporting, including earned value analysis.

60. Metropolitan Housing Trust applied many P/ABT to its reactive repair process, including using ABC to calculate the cost of the process, identifying potential cost-savings; benchmarking with another organization utilizing the same software; establishing best practice, performance measurement and comparisons of process-based methods and its traditional budgeting.

## 17 Process-based accounting incorporating Six Sigma

61. Jim Brimson in his book *The Handbook of Process-Based Accounting: Leveraging Processes to Predict Results* brings together all of the elements of process-based management and other accounting and performance measurement tools and techniques, including Six Sigma, into one all-encompassing predictive accounting framework.

62. Six Sigma is a measurement of standard deviation. Pande Nueman in *The Six Sigma Way* says:

*Whether designing products and services, measuring performance, improving efficiency and customer satisfaction – or even running the business – Six Sigma positions the process as the key vehicle of success. Research has shown that the costs of poor quality (rework, mistakes, abandoned projects, etc.) in service-based businesses and processes typically run as high as 50 per cent of total budget.*

63. The GE case study explains that the reason for the introduction of Six Sigma is to improve processes so that GE will not have to spend \$7 billion of its revenues each year on scrap, rework and error resolution. An example success story was the plastics division, which essentially created a free plastics plant which would have cost \$400 million to build.



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