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11

Managing the Supply of IT Services, Applications and Infrastructure

- The service user is, to some extent at least, involved in the delivery process and influences the performance of the service. Different users have different expectations of the service and varying knowledge of how to use it. However, based on their general experience, service users now expect a high quality of service (availability, responsiveness, first-time problem resolution, etc), as they perceive it, whenever they avail of any service, whether it be internal or external. Measuring service performance is primarily about measuring user perceptions of the service delivered against their expectations.

- The more the user understands what is involved in the service delivery process, its complexity or otherwise, the more their expectations of performance will match what can actually be achieved. Equally, if users can see the 'queue' for the service they require, the more 'reasonable' they become in their expectations. Often, the queue for IT services is not visible to the users, unlike in a physical environment such as a fast-food outlet or a sophisticated call centre, which informs callers of their queue position.

- Services are, to a large extent, produced and consumed simultaneously based on a user request to be served. This implies that it is difficult to build an inventory of work and schedule activity and resources due to the uncertainty of demand. Equally, idle service capacity cannot be reused unless resources are flexible and can be deployed across a range of services or the work profile can be balanced across demand-driven and 'off-line' or developmental activities.
- However 'technical' the service, people and the role they play are critical to the perceptions of the service received—the 'service experience'. Proficiency and efficiency in satisfying the need are essential, but service quality will equally be judged on the nature of the personal interaction between the user and provider, at the point of delivery

- There is often a difference between the user of the IT service and who pays for it, implying different perceptions of service value. This is similar to business-class or first-class travel, where the traveller may enjoy the convenience and quality of treatment, but the company may not see the very significantly higher cost as justified. The IS budget holder may not be a significant user of IT services, and those who do use the service may be unaware of the costs of its provision.

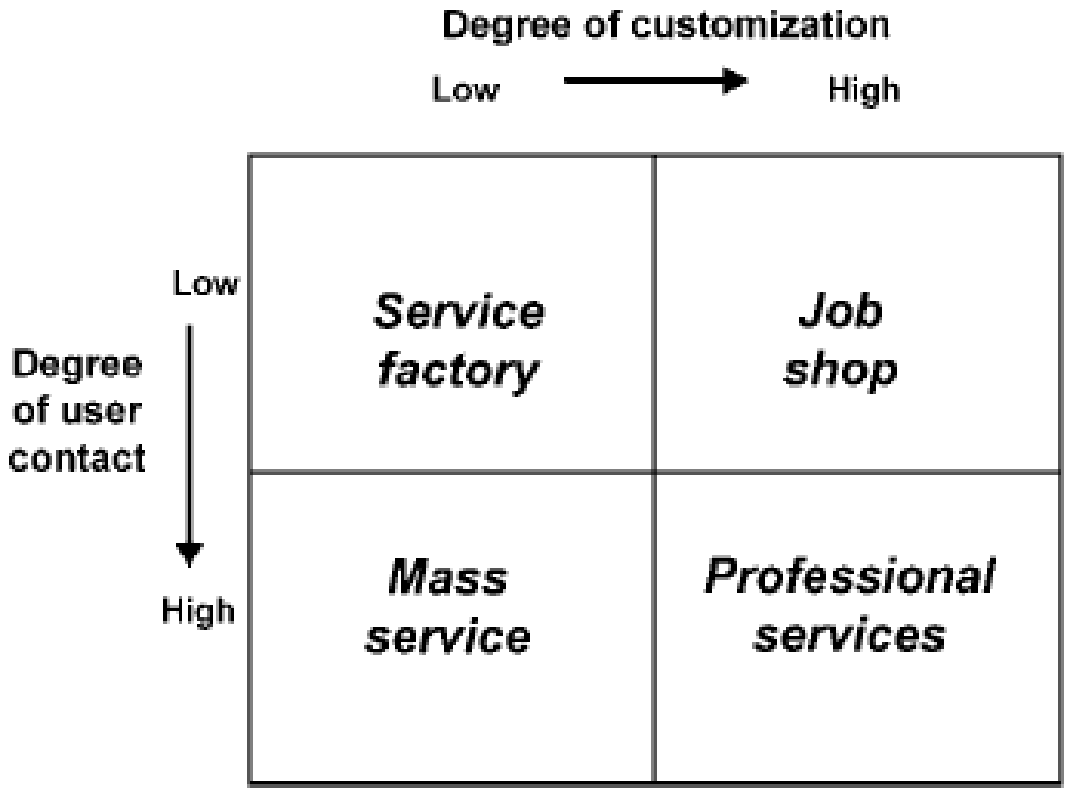


Figure 11.1 Generic service models

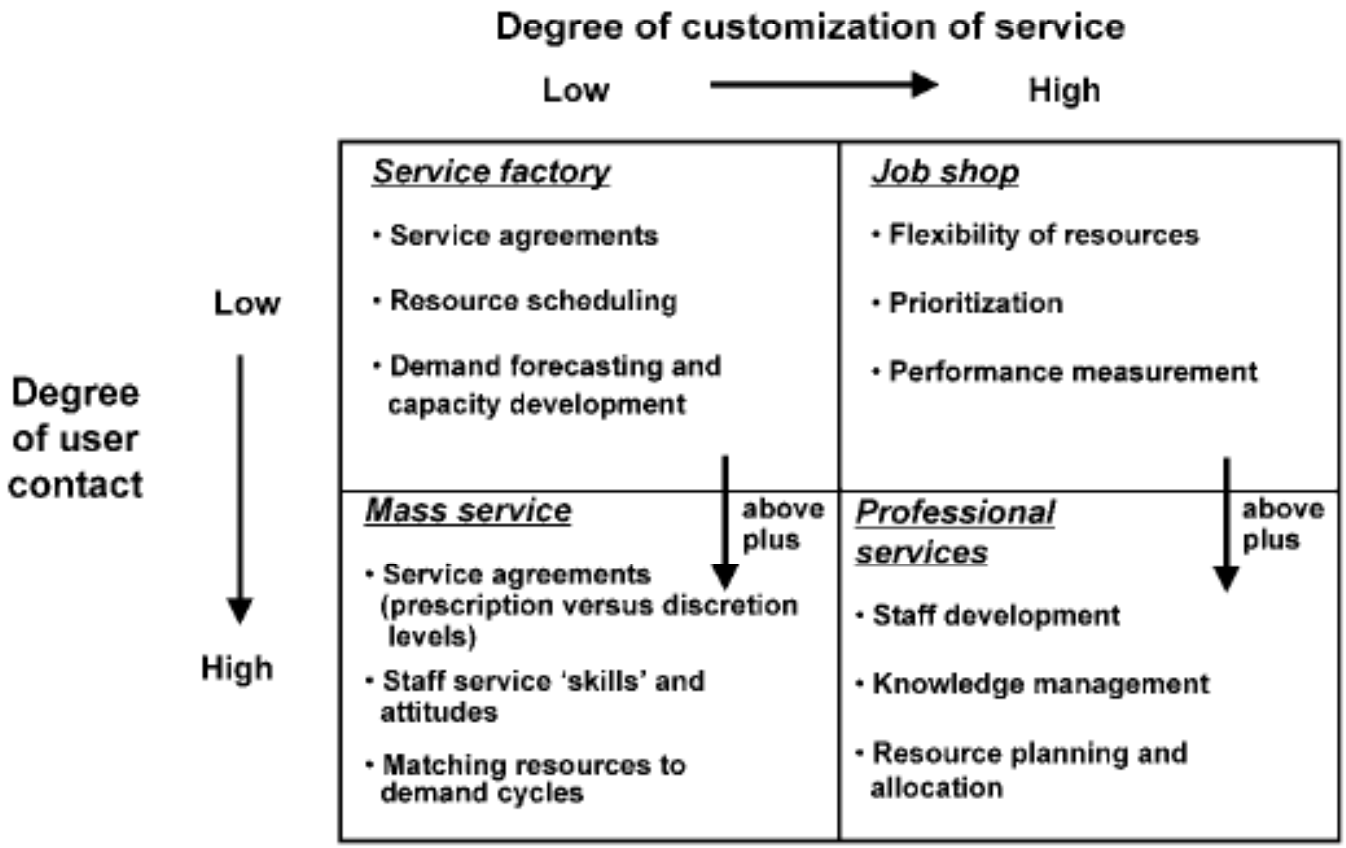
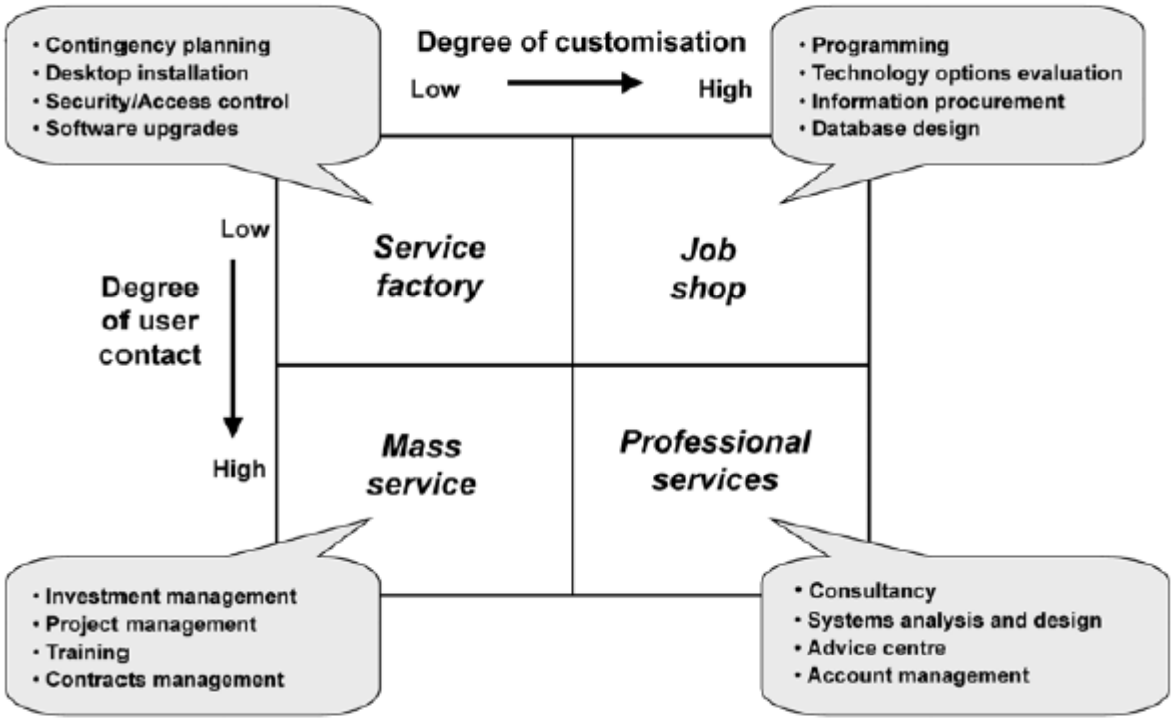


Figure 11.2 *Service models: some key management issues*



NB: These are just example positionings for various services

Figure 11.3 *Service models and IT services—examples*

Service quality

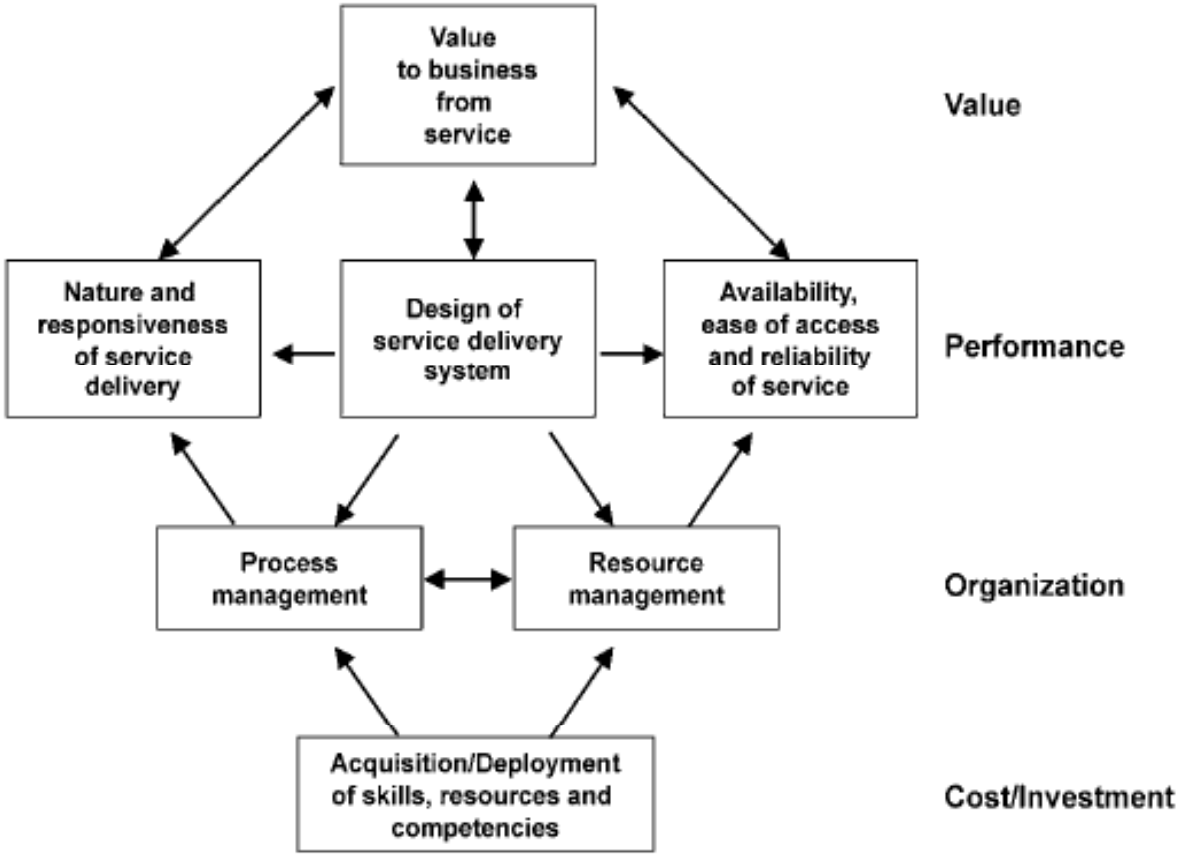


Figure 11.4 *An overall service framework*

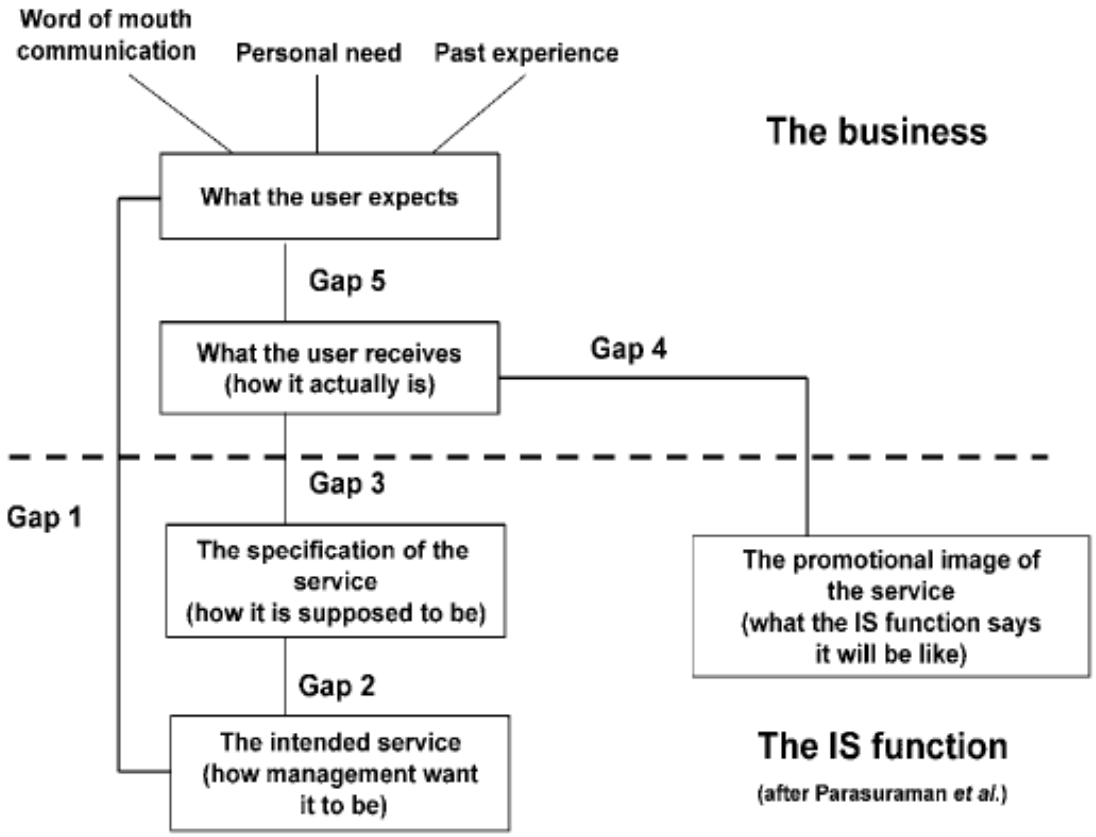


Figure 11.5 *The gaps in the IS service delivery (source: based on the work of Parasuraman, Berry and Zeithaml)*

The Gaps

1. Not understanding what users expect or value due to:
   —a lack of user needs analysis;
   —ineffective communication by either or both parties;
   —excessive bureaucracy in the IS function.
2. Setting the wrong IT Service Standards due to:
   —lack of commitment to IT services by IS management;
   —perceptions of infeasibility in meeting user demands;
   —inadequate task definition and standardization or inadequate resourcing to standards set;
   —absence of objectives for the service to achieve and/or inappropriate performance measurements.

The Gaps

3. Underperformance of the service due to:
   —role ambiguity, including the user's role in service delivery;
   —lack of resource availability;
   —lack of actual or perceived controls;
   —lack of teamwork and inappropriate resource use, or inappropriate use of the service.
4. Poor communication of what the service is and can deliver due to:
   —a propensity to overpromise and/or overreact to 'complaints';
   —inconsistent communication across the user communities;
   —lack of visibility of the service process.
5. Expectation versus perception gap due to:
   —not understanding user requirements and reasons for them;
   —users not understanding the service process and the implications of their demands;
   —user expectations actually being impossible to satisfy!

Service delivered vs. cost Trade off

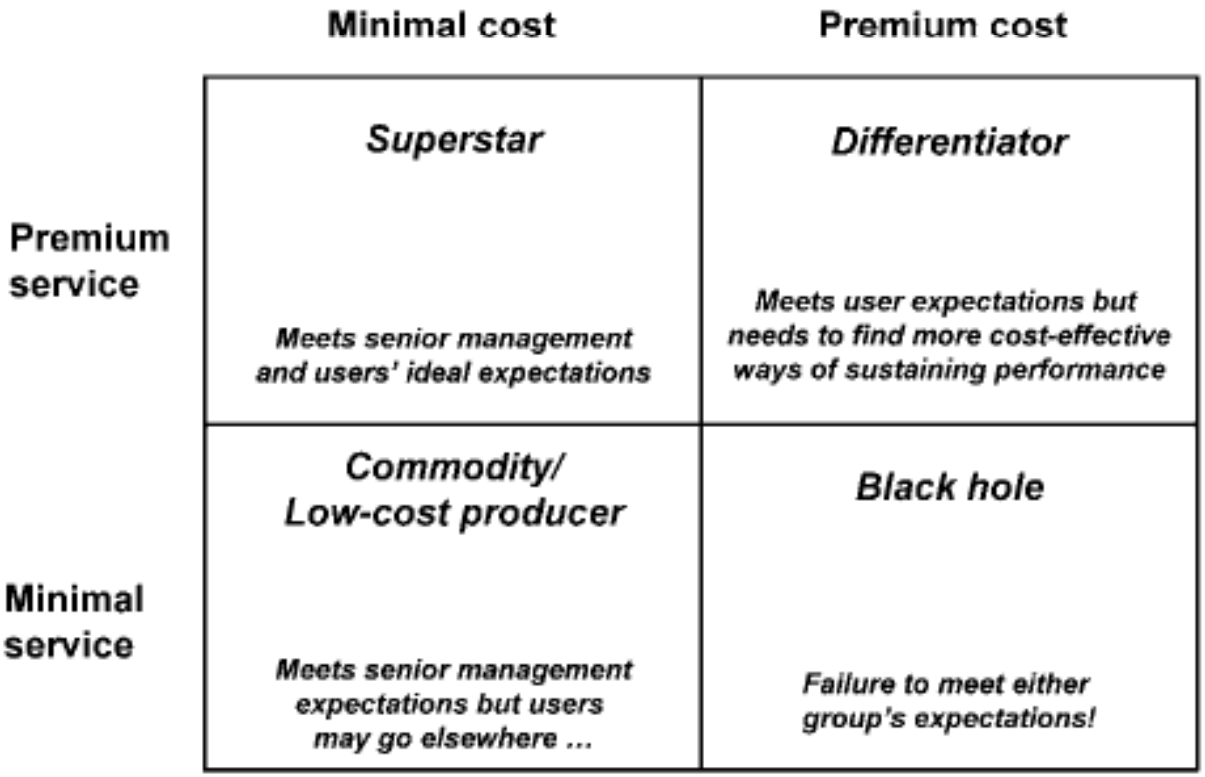


Figure 11.6 *IT cost/service trade-off* (source: *M.C. Lacity and R. Hirschheim,* Beyond the Information Systems Outsourcing Bandwagon: The Insourcing Response, *John Wiley & Sons, Chichester, UK, 1995)*

APPLICATION DEVELOPMENT AND PROVISIONING STRATEGIES

The emergence of Application Service Providers (ASPs), providing rented software via the Internet, is the latest development in this area; the role and potential of ASPs is considered later in the chapter, under outsourcing. Although less application software is produced in-house, custom-built software is often developed by third parties, and most large software packages require extensive configuration and even some customization before they are implemented. The trend for more and more of an organization's applications to be designed and developed by major software houses or 'business solutions' companies is likely to continue.

ALIGNING THE DEVELOPMENT APPROACH TO THE APPLICATIONS PORTFOLIO

Strategic Applications

For strategic systems, speed of development and flexibility of design are essential, and cost is less important especially when the goal is gaining and sustaining competitive advantage. The 'window of opportunity' may be short-lived or uncertain. They are best achieved through a close partnership between business users (preferably senior managers who understand the emerging business needs) and very experienced IS/IT business analysts, to ensure that the business needs are analysed and met in the most effective way. This is especially important when the system has external linkages to customers or suppliers and is delivering benefits to both parties. There is often a need for incremental development, since new options and needs will be discovered as implementation proceeds. Typically, the system is not automating an existing business process, but changing or creating one.

ALIGNING THE DEVELOPMENT APPROACH TO THE APPLICATIONS PORTFOLIO

Key Operational Applications

These are generally the 'workhorse' systems, carrying out the main operational processes of the business (e.g. customer order entry and fulfilment should be well designed both in business process and technical terms). Key operational systems need to be efficient and robust, to deliver cost-effective and problem-free use over an extended period. Since they often have to be integrated with other primary business process systems, they benefit from adhering to information management standards and from complying with the evolving long-term systems and information architecture. They can often be met by application packages or third-party-developed software, but further development may be needed to provide effective integration, resource sharing and information management. By selecting a comprehensive package (e.g. ERP), the additional work can be avoided, but some user needs may have to be compromised. When developed in-house, they are usually produced using traditional project management (e.g. PRINCE) and formal structured methods (e.g. SSADM), automated with software and information engineering tools.

ALIGNING THE DEVELOPMENT APPROACH TO THE APPLICATIONS PORTFOLIO

Support Applications

If new support applications are required or existing ones are to be replaced, the most appropriate solution is to buy in sound standard proprietary packages that meet the business requirements as closely as possible. The package should not be customized: business processes and procedures should be amended to fit the package. Very rarely can an organization justify the allocation of valuable skills and resources to developing support systems for themselves or the future costs of modifying every new package release to satisfy their business idiosyncrasies.

ALIGNING THE DEVELOPMENT APPROACH TO THE APPLICATIONS PORTFOLIO

High Potential 'Applications'

As discussed in Chapter 7, the term 'applications' is perhaps inappropriate in the high potential segment, since it is the research and development (R&D) activity enabling new technology to be tried out to ascertain its potential applications for the organization, or to explore the potential of technology in relation to an innovative business idea. The need is for independent, rapid, low-cost development of prototypes and even pilot implementations that, if they fail, can be abandoned without wasting significant resources. Since risk is high and success is far from certain, effective cost control is essential.

THE SPECIAL CASE OF 'ENTERPRISE SYSTEMS'

The 1990s saw the extensive implementation of Enterprise (or Enterprise-wide) Systems (ES) across many industries. The best known are probably the Enterprise Resource Planning (ERP) packages provided by a range of vendors, initially for the manufacturing sector. Since then, versions of ERP have been developed for other industries such as logistics, utilities, health care, retail and even education. ES systems, either package based or custom built, have been developed across most industrial and commercial sectors, ranging from Customer Relationship Management (CRM), Call Centre Management, Supply Chain Management (SCM), Policy Administration (in insurance) to Electronic Patient Records in health care.

STRATEGIC	HIGH POTENTIAL
• Application generators • Dynamic Systems Development Methodologies (DSDM) • Joint Application Development teams (JAD) - share knowledge • Iterative development via prototypes/pilots • Create new processes and databases • Effective links to key operational systems - but protect core systems • Packages unlikely to meet needs unless modified to unique version • Design for adaptability to meet changing needs	• Prototyping and business pilots of applications to test performance, scaling, acceptance • Evaluation of benefits and how to achieve them • Rapid, low-cost, iterative development • Business champion • Fixed time/cost allowance • New skills/skills transfer from external expertise • Independent - low integration
• Structured Systems Development Methodologies (SSDM) • Software engineering • Industry-specific packages - integrate/interface across packages but minimal customization • Corporate data management controls • Combined systems and business knowledge in development team • Process re-engineering • Strict specification and change control processes • Design for performance	• Standard functional packages - compromise business needs to package capabilities. No customization • Low-risk, proven solutions • Outsource operation and maintenance - if cost-effective • Interface, not integrate • Use package databases and data standards • Design procedures and processes to use the software efficiently • Buy, not build
KEY OPERATIONAL	SUPPORT

Figure 11.7 *Development approaches and characteristics*

Table 11.1 *Implementing 'Enterprise Resource Planning' systems—one company's experience* (source: Achieving the Benefits from Software Package Enabled Business Improvement Programmes, *Best Practice Guidelines, IMPACT, London, 1998)*

First attempt—failure	Second attempt—success
IS led, with insufficient knowledge of the business function concerned	Business Function led, by a newly recruited manager, experienced in the function, supported by IS
Belief that the requirements were simple and already known—just use the package to automate the current processes	Site visits and reviews of other companies procedures to establish best practice and system requirements
Belief that this was a low-risk and straightforward implementation	Knowledge that this would require some major changes
Lack of business buy-in led to both the new and old (mainly manual) system remaining in place, and little move by the business to adopt the new system	New procedures completely replaced the previous system and all staff were required to use them; facilities for the old system withdrawn
Little business change	Organizational and business process changes
Bespoke amendment of package. Longer and more complex system build, and difficulty applying upgrades	Minimal changes to the package, and innovative use of built-in facilities. Shorter delivery timescale and easy future upgrade paths
Costs, no benefits	Benefits have exceeded expectations

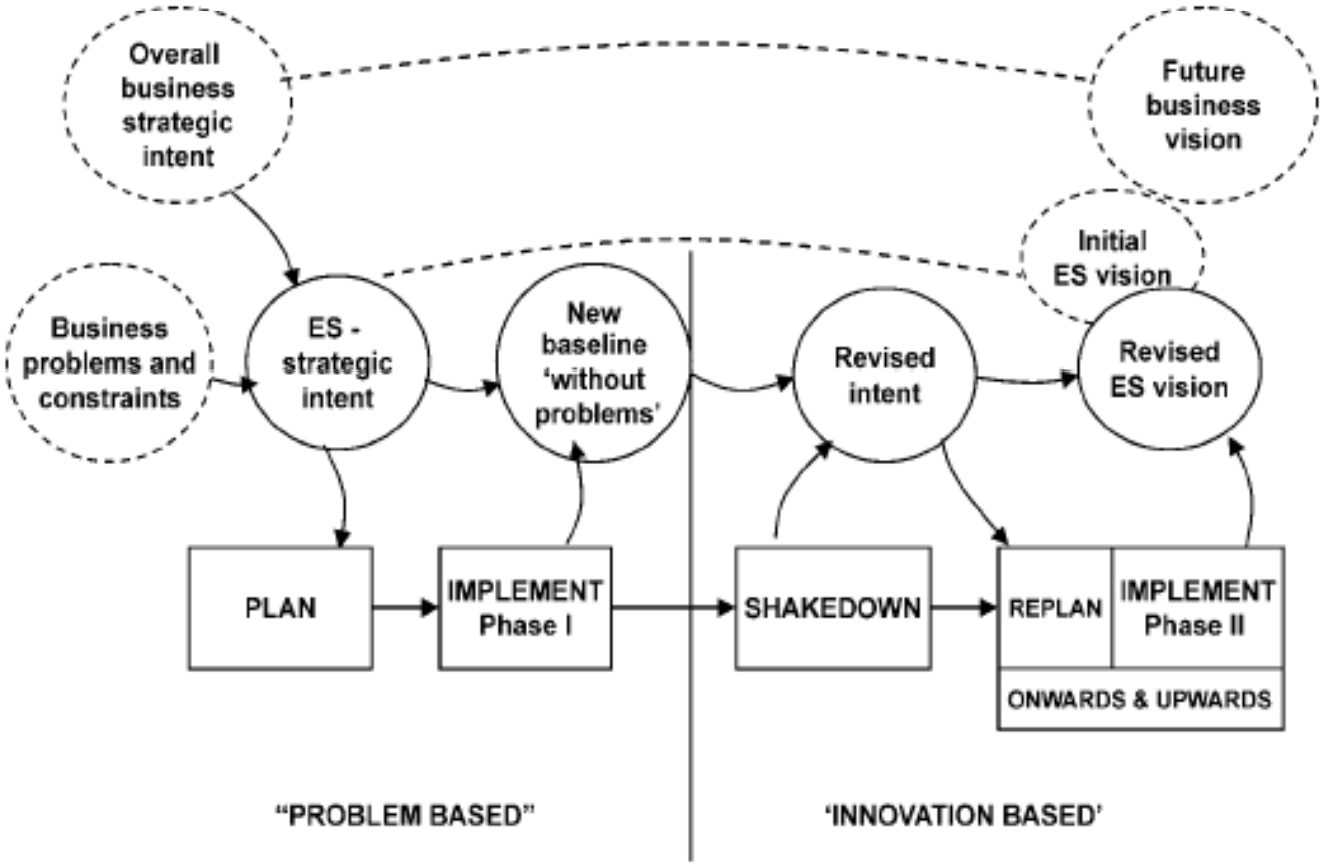


Figure 11.8 *Enterprise systems—the two-stage view of implementation*

Linking the IT Infrastructure with the Business Strategy

Figure 11.9 *Reach and range* (source: *from P.G.W. Keen,* Shaping the Future, *Harvard Business School Press, Boston, 1991)*

Linking the IT Infrastructure with the Business Strategy

- *Linking technology investments to business needs*—how to relate the specific requirements for investment in technology to the business needs, and to determine the implications of gaining or not gaining approval, and how to make sure that the proposed development is the best way of obtaining the indirect benefits. While per unit costs of technology are going down, spending on IT is still increasing, with investments in new applications both for business systems and individual or group working, and in the automation of more activities,

Linking the IT Infrastructure with the Business Strategy

- *Identifying technical opportunities*—although business managers do not need an in-depth understanding of technology, they do need sufficient understanding of its capability to achieve the business requirements, in terms of its ability to: (i) improve or radically change the products and services of the business, and develop electronic trading capabilities, (ii) improve the productivity and effectiveness of business processes and people and (iii) impact the economics of the business.

Linking the IT Infrastructure with the Business Strategy

- *IT investments by others*—how existing and potential competitors, customers and suppliers are using or could use technology to improve their competitive positions and the likely consequences in terms of (i) impact on the market and customers, (ii) changing relationships and cost structures within the value chain and (iii) threats or opportunities created by new IT-based entrants in the industry. Business managers need the knowledge to assess the situation, understand the options available, assess their implications and be able to respond accordingly in terms of commissioning the investments or provisioning by outside parties.

Linking the IT Infrastructure with the Business Strategy

- *Technical implications and 'hype'*—most business managers are required to make important business decisions, or required to recommend strategies to the overall management team. They are unlikely to have an in-depth understanding of how the multitude of technologies work, but must know enough to be able to ask sensible questions and not to be confused by the advice of potential suppliers or 'in-flight' magazine articles and even TV adverts! However, they will need to rely on technical management and specialists to explain and interpret the essentials for them.

Linking the IT Infrastructure with the Business Strategy

- *Business and technical awareness*—the CIO or IT director not only has a responsibility to instil business judgement and awareness in his technology experts but also to implant a sound, albeit high-level, understanding of technology and technical issues in general management.
- *How to make decisions about IT resources*—this includes the sourcing and, where appropriate, outsourcing of infrastructure products and services.

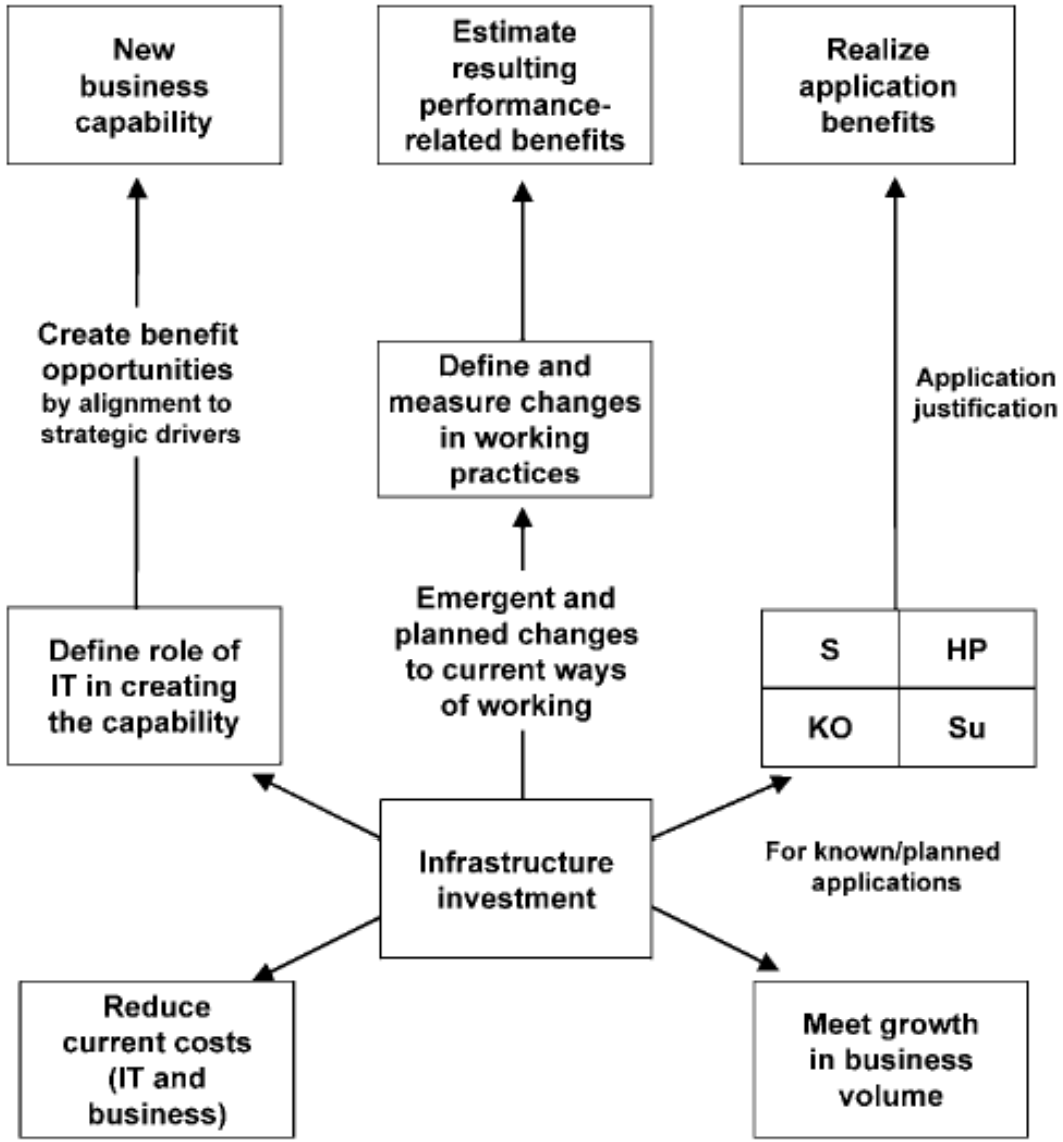


Figure 11.10 *Justifying infrastructure investments*

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OUTSOURCING STRATEGIES

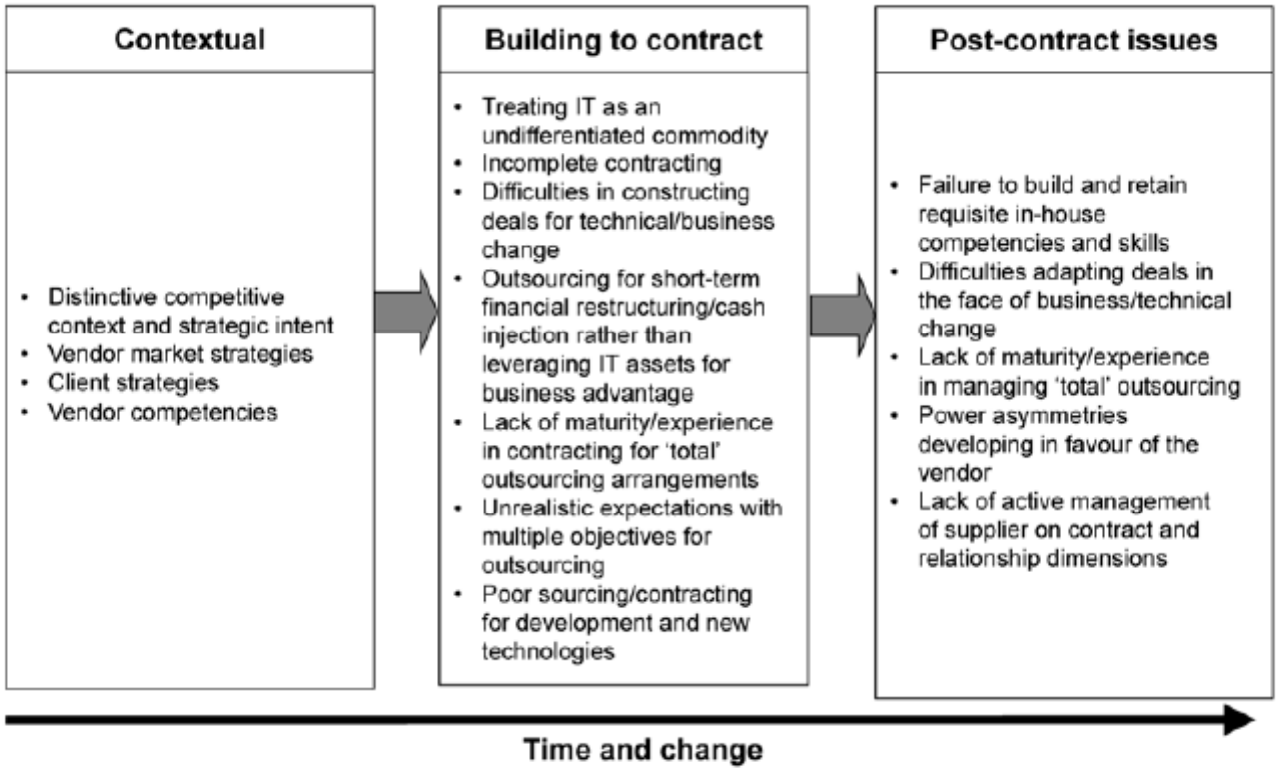

Figure 11.11 *Outsourcing risk-analysis framework* (source: *L. Willcocks and C. Sauer, 'High risks and hidden costs in IT outsourcing',* Financial Times Mastering Risk, *May 2000)*

Risks Associated with Outsourcing

- *Treating IT as an undifferentiated commodity to be outsourced.*
- *Incomplete contracting.*
- *Lack of active management of the supplier on (a) contract and (b) relationship dimensions.*
- *Power asymmetries developing in favour of the vendor.*
- *Inexperienced staff.*
- *Outsourcing for short-term financial restructuring or cash injection rather than to leverage IT assets for business advantage.*
- *Hidden costs.*
- *Managing multiple vendors.*
- *Loss of innovative capacity.*
- *Cultural incompatibility.*

Table 11.4 *Theoretical economies of scale* (source: *from M.C. Lacity and R. Hirschheim,* Beyond the Information Systems Outsourcing Bandwagon: The Insourcing Response, *John Wiley & Sons, Chichester, UK, 1995)*

Source of IS costs	*Internal IS function*	*Outsourcing vendors*
Data centre operating costs	Comparable to a vendor for 150–200 MIP range	Comparable to large IS function. Inherent advantage over small IS functions
Hardware purchase costs	Large companies: volume discounts comparable to a vendor	Volume discounts comparable to large IS function. Inherent advantage over small companies
Software licensing costs	Comparable due to group licenses	Comparable
Cost of business expertise	Inherent advantage	
Cost of technical expertise		Inherent advantage
Cost to shareholders (the need to generate a profit)	Inherent advantage	
Research and development costs		Inherent advantage
Marketing costs	Inherent advantage	
Opportunity costs		Inherent advantage
Transaction costs	Inherent advantage	

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Cost of technical expertise		Inherent advantage
Cost to shareholders (the need to generate a profit)	Inherent advantage	
Research and development costs		Inherent advantage
Marketing costs	Inherent advantage	
Opportunity costs		Inherent advantage
Transaction costs	Inherent advantage	

Contractual Issues

- *Length of contract.*
- *Service definition.*
- *Service-level requirements specifications.*
- *Service-level measurement and verification.*
- *Incentives for service-level attainment.*
- *Coordination and communication mechanisms.*

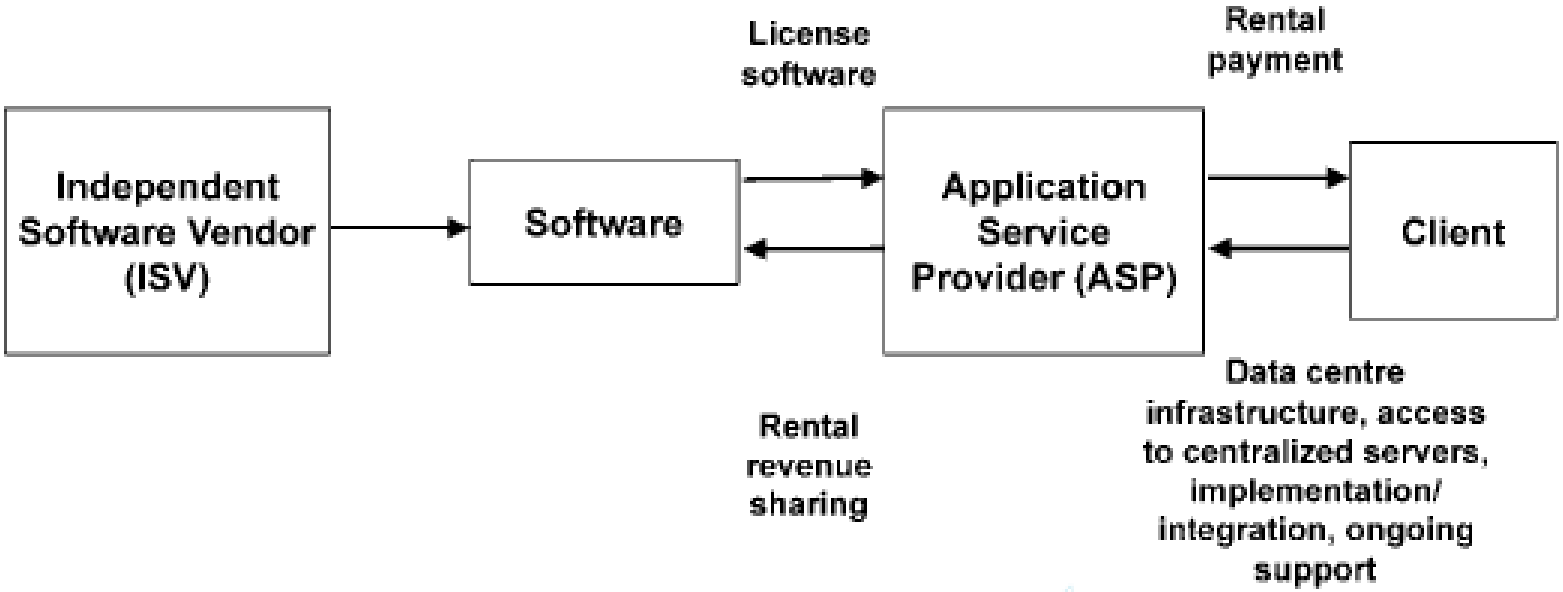

Figure 11.12 *Schematic of application service provider*

- *Applications provisioning*—essentially providing an information-handling capability, either through proprietary applications such as property management, specialized health-care patient record keeping or analytical/mathematical services or widely-used software packages from the leading ERP and CRM vendors.
- *Infrastructure operations* can include provisioning the customer's desktop environment, as well as operating data centres to host the applications. Data centre operations include the full range of hardware/systems software management, security and disaster recovery as well as the necessary back-office systems such as service usage, monitoring, accounting and billing.
- *Network connectivity*—providing connections to the Internet for end-customers or the application provider (essentially acting like an ISP). Reliability, performance and security of network communications are potentially weak links in the chain.
- *Supporting services*—providing hardware installation and maintenance services at customer sites or end-to-end management services for all aspects of implementation and operations across the entire ASP delivery chain for the duration of the ASP contract.

Applications Service Providers

- Reducing 'costs of ownership'. Although costs and service levels vary widely according to the types of application service provided, studies have indicated that, by renting an application from an ASP, a company can save between 30% and 60% over purchasing and managing the hardware and software for the application themselves.
- Providing more predictable costs with less financial risk. Pay-as-you-go pricing takes the economic burden of buying software and attendant hardware and transfers it to the ASP.
- Flexibility to exit or radically change operating scale. ASP contacts are typically one year with minimal or no exit fees. Many ASPs represent multiple software package vendors, and clients are generally free to add or change services as needed.
- Quicker deployment of new applications and IT capabilities. There can be a significant reduction in the overall cycle time to put a new information system into productive operation.
- Significant reduction in technology complexity. Buying software has always meant having to buy at once all the technology necessary to support it—networks, hardware, support software. ASP's remove that complexity from the equation—theoretically, at least—by providing all the supporting technology themselves. The organization buys a business service rather than a software application and all that goes with it.[52]

Table 11.6 *Checklist for selecting ASP*

- Failsafe back-up servers to ensure 24 ×7 ×365 application uptime
- Automatic load balancing to ensure accessibility
- Functional access limited by highly configurable application-level security
- Automatic off-line data back-up scheduling
- Service level agreements (SLAs) to ensure performance levels are maintained
- Secure Internet access to application servers, via VPN (virtual private network), etc.
- Support for non-public electronic transaction transmissions like EDI
- System set-up function templates to speed implementation
- Simple sign-up to make adding new users easy
- User statistics logs showing user activity by application
- Automatic data upload/download from applications
- Email delivery of user alerts, application reports, etc.
- Online FAQs (frequently asked questions), manuals, training courses
- Online support via email, self-service helpdesks, real-time Internet chat