7
Managing the Applications Portfolio

The applications portfolio concept, introduced in Chapter 1 (see Figure 1.7), is a means of bringing together existing, planned and potential information systems and assessing their business contribution. It has been referred to in previous chapters, which have been concerned primarily with how to populate the portfolio with required applications. Gaining business management understanding and agreement on the contribution expected from the variety of current and future systems is the cornerstone of any strategy.

The usefulness of the matrix is borne out by the ease with which management is willing and able to categorize systems in this way. A survey of some 300 organizations that had become aware of the concept showed that 70% were using it within their approach to managing IS/IT. One reason is probably the familiarity of business managers with similar portfolio models like the Boston Consulting Group's 'Boston Matrix', described in Chapter 2. As will be seen in this chapter, these similarities are more than superficial—many proven attributes of other portfolio models can be adapted to address key issues in IS/IT management. Another reason for its usefulness is its simplicity, which also implies that it has limitations and cannot deal with every conceivable situation. But, it can provide valuable insight and guidance in addressing the issues associated with the majority of business applications of IS/IT.

The application portfolio, as described so far, owes much to the 'McFarlan Grid'[1] used to assess the overall contribution of IS/IT to business success. The limitations of this perspective were discussed in Chapter 1. In this chapter, we develop this basic model into a management tool.

Two-by-two matrices are very popular ways of describing the implications of unrelated, but interacting variables, and a number of other such

matrices related to the management of IS/IT have been developed. The first part of this chapter briefly reviews some of them in order to synthesize a set of relevant issues, attributes and options associated with the portfolio segments. The main purpose in classifying applications is to ensure that they are managed successfully and that the expected contribution is delivered. Based on the issues relevant to each segment, appropriate implementation strategies can be adopted. These, in turn, can be related to the strategy formulation and planning approaches, as described in Chapter 3 (based on work by Earl[2]) to provide consistency of management from strategy formulation to implementation.

As noted above, any simplification of a complex situation has its limitations. Precision should not be expected; merely relevant guidance to enlighten and support management decision making in what is often an area fraught with uncertainty and even conflict. It is a valuable 'framework', which helps to link together and reconcile the complexities involved in managing the demand and supply components of the IS/IT strategy, in particular to achieve ownership by business managers of their IS/IT applications and the issues that have to be addressed in achieving success. The application portfolio will evolve over time, and how the effects of that evolution can be managed successfully will be considered.

CONCLUSIONS FROM VARIOUS MATRICES AND MODELS

A number of matrices have been produced to help management decision making with respect to IS/IT planning, utilization and resourcing. The early versions were analysed in detail by Ward.[3] Some of the conclusions from that analysis are useful to show how the ideas and concepts are generally complementary, even convergent. More recent versions, devised to address developments in the 1990s, are also, in essence, very similar, even if the terminology used is different. A composite matrix, including some key ideas, is shown in Figure 7.1. The main models on which the composite matrix is based include the following:

1. The Sullivan[4] matrix, which has already been described (see Figure 1.9), considered the range of IS/IT management issues that depend on the combination of infusion and diffusion of IS/IT in the organization. Infusion is 'the degree to which IS/IT has penetrated a company in terms of importance, impact or significance', and diffusion is 'the degree to which IS/IT has been disseminated or scattered throughout the company'. Sullivan identified the need for new, demand-driven and decentralized planning approaches to improve

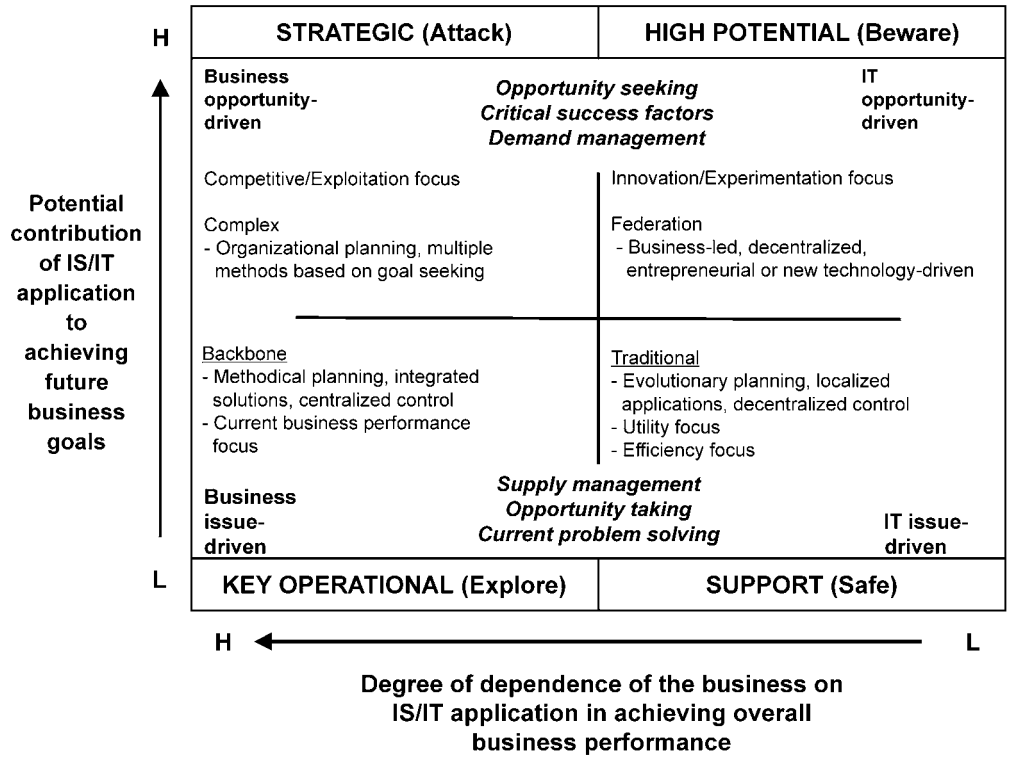

Figure 7.1 *A composite matrix*

the management of the strategic and high potential quadrants, in addition to the better understood strategy formulation and planning approaches required for 'backbone' (key operational) and 'traditional' (support) systems. He expressed the need for an 'eclectic' planning method to deal with the strategic developments when IS/IT is considered in establishing the business objectives or is being used to transform business processes (i.e. when there is an interdependent relationship between IS/IT and business strategies, which is increasingly becoming the case).

2. The Information Technology Assessment and Adoption (ITAA) matrix developed by Munro and Huff,[5] based on work by Benjamin *et al.*,[6] considered how organizations have adopted IS/IT as a competitive weapon. Most companies, according to Munro and Huff, are either 'technology driven'—looking for ways of deploying new technology to advantage—or 'issues driven'—looking for new business opportunities within the known possibilities of existing

technology. These relate mainly to high potential and key operational-type environments, and few companies achieve 'normative' planning where business issues, opportunities and technology are effectively matched—an 'ideal' planning relationship as they describe it (i.e. that required for strategic applications to be developed).

Galliers[7] developed a matrix for a similar purpose that, like the Sullivan matrix, considers factors affecting planning methods, but this time in relation to:

- long-term and short-term thinking, strategy or issue driven; and
- business issues versus technology-driven planning.

Galliers separates the need for IS/IT to react to current business issues (key operational) from the need to react to changing future objectives (strategic), and compares them to the proactive IS/IT stance required for high potential opportunities. Like most others, he identifies an efficient, problem-solving basis for managing support-type systems.

3. Two matrices, developed by Ives and Learmonth[8] and Galliers,[9] both considered how the 'value adding potential' of IS/IT in the business and the 'quality of IS resources' (i.e. the capability of the organization) affect how IS/IT is deployed and how it is managed. They showed how a vision of what is possible *plus* strength of resources are essential if IS/IT is to be used as an offensive (i.e. strategic) weapon, and how the two are often interrelated. In many organizations, the lack of vision reduces the ability of even good resources to do more than 'explore' opportunities as issues arise. Low quality of resource implies a 'safe' support systems-only approach, and the organization will become very vulnerable, due to its inability to respond to new, high potential or strategic applications developed by competitors. In such a case, 'vision' is not enough—the resource must be improved at the same time and the organization must 'beware' of IS/IT investments by competitors.
4. An example of more recent matrices, which were devised to help management address 'e-business' options, is the 'e-business value matrix' described by Hartman and Sifonis.[10] The axes of the core matrix are (a) business criticality and (b) practice innovation, and the four resulting segments equate closely with those of the application portfolio. Low criticality and low innovation are defined as the *new fundamentals*, and the characteristics are close to support. Key operational is a direct equivalent of *operational excellence*—high criticality, low innovation. High innovation but low criticality is called *rational experimental* and the parallels with the high potential segment are obvious. Finally, the strategic part of the matrix equates reasonably

well with the high criticality, high innovation combination called *breakthrough strategies* by Hartman and Sifonis. The implications they describe in terms of the best approaches to identifying, justifying and managing e-investments in an organization are similar to the guidance that can be obtained from combining the attributes of previous matrices.

In most of the models, all of which address similar issues from different directions, clear differences can be seen in the ways in which applications in each of the four quadrants need to be planned and managed. Not all ideas map precisely onto the application portfolio, and there is not always full agreement on the specific needs of the strategic and high potential segments, perhaps due to their more uncertain and changing nature. However, there is general agreement in the key operational and support areas. The composite matrix in Figure 7.1 attempts to reflect the key ideas from the various matrices in terms of the issues or options for managing the portfolio segments. These are examined in more detail later in the chapter. The axes are derived primarily from McFarlan's work. The horizontal axis attempts to reflect the ability of an organization to control its destiny, whereas the vertical axis reflects the uncertainty due to external forces of future IS/IT impact.

Matrix analysis approaches are attractive because they reduce an apparently infinite continuum of alternatives to a manageable, pertinent number of discrete options from which high-level directions can be determined. They demonstrate relationships that evolve over time, but that will normally have to be managed to success simultaneously in the organization. Like many such models developed to assist management, they are often overly simple, and more complex models would be needed to reflect the diversity of reality. As complexity is added, however, clarity of perception often dims. Without intending to introduce confusion by complexity, it is worth considering a few further aspects of the models.

In relation to the Sullivan model, which considered the impact of IS/IT on a business (infusion) in relation to the ability to devolve IS/IT decisions (diffusion), an organization in the complex quadrant will have, almost by definition, a comprehensive application portfolio. Diffusion equates to 'informality' in that each part of the business can decide what it wishes to do, but some formality is needed if applications spanning different parts of the business are to be identified and the benefits delivered—and most strategic systems cross organizational or functional boundaries and/or require business processes or organizational relationships to change.

Figure 7.2 suggests a number of cause-and-effect relationships, which are generally borne out by observation in many organizations:

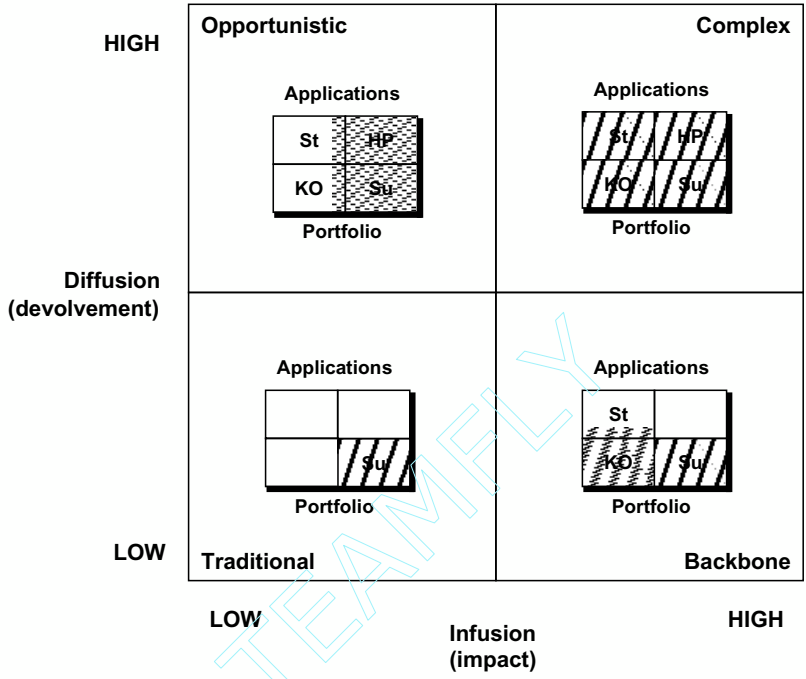

Figure 7.2 *Application portfolios in different IS/IT environments*

- Organizations that have a traditional, low impact view of the role of IS/IT with highly centralized IT decision making will tend to have a predominance of support applications.
- Those with devolved IT decision making, because it is not seen as particularly critical to overall business success, will also produce a profusion of support systems, solving local problems. A number of high potential ideas will probably also be developed, but it will be difficult to bring them to strategic fruition because of the localized view of their value and the limited IT capability available in each area. Decision making is localized and, so, although some key operational systems will be implemented, integration across the business will be poor because system interrelationships are not considered when satisfying the local needs.
- Where the impact of IS/IT has increased, probably due to external pressures, but IT is kept highly centralized, both key operational and support systems will be developed and continually improved, but more innovative uses of IS/IT will not be instigated, because of the limited knowledge in the business of what is possible.

There are reasons for these cause-and-effect relationships, based on the way in which IS/IT evolves in organizations and the way in which the IS/IT strategy has to respond and become more sophisticated and better balanced over time. This also implies that a number of different methods need to be in place at any one time to develop a relevant and complete portfolio.

Most of the models address the need to accommodate both centralized and decentralized management approaches, the balance of which will depend on the degree of integration required in the business and organizational processes. Particular competitive opportunities and new uses of IT will tend to address singular or few applications and, initially at least, can be exploited most advantageously close to the business opportunity. Applications that produce benefits by business integration or sharing of assets require strong business coordination, competent IS/IT management and sustained investment in resources. The Sullivan model helps understanding of how the application portfolio will evolve by the effects of these forces within an organization.

CLASSIFYING THE APPLICATIONS IN THE PORTFOLIO

How to populate the portfolio with future IS/IT investments is described in the preceding chapters, and the basic rationale for a portfolio approach was discussed in Chapter 1. Describing the existing and future applications in this way helps the task of obtaining a consensus among executive management, line managers and the IT management on the content of the IS strategy. Once the portfolio is understood and agreed, decisions on how best to manage each application, both existing and future, can be made, along with overall decisions on the use of resources across the portfolio and the selection of the most effective sources for supply—which aspects should be managed in-house and which can and should be outsourced.

While agreeing the contribution and, hence, portfolio positioning of future investments is important, so is understanding the role of and value to the organization of the existing application set. Some applications may be obsolete and no longer required, others may need significant investment to avoid future business problems, some may be underexploited and others may be consuming undue amounts of resource in relation to their business value. Table 7.1 suggests a set of criteria that can be used as a basis for a strength, weaknesses, opportunities and threats (SWOT) analysis of the current applications, to determine the need for action, either to improve their contribution or enable other, related applications to be developed or used better.

Table 7.1 *SWOT analysis of existing portfolio*

Analysing the applications in the portfolio (SWOT)

EXPLOIT STRENGTHS:

- high future potential, currently underexploited;
- can be extended, enhanced to be of more value;
- could be more valuable if integrated more effectively or used more extensively;
- critical to the business, but data quality is poor;
- needs to be developed to meet current and future business needs;
- must be enhanced to meet changed business requirements for future;
- system required, but needs to be reimplemented to absorb less resources or overcome technology obsolescence;
- system will be less important in future—needs to be simplified/reduced to real needs;
- system is no longer of value—should be discontinued.

OVERCOME WEAKNESSES

Merely classifying current and future applications into a 2×2 matrix is of no great value, unless it causes each application and the overall portfolio to be managed more effectively. The process of classifying the applications is as important as the end result, since the discussion involved will enable different perspectives to be understood (and hopefully reconciled!) and the implications of the decisions made to be appreciated by all parties. If a particular application is considered by one group of users as strategic, due to their uses of the output, and as support by another that provides the input, it is unlikely that the maximum benefits available will be delivered, due to the differing operational priorities and quality of information management in each group. A realistic and agreed assessment must be made.

Each organization will have slightly different interpretations of the terms used for each segment. Hence, a decision-support tool that would fit every organization's criteria for classification cannot be defined, but Box 7.1 contains a simple starting point for the process, by posing questions that can help the analysis. It should only be used to guide the assessment, not as a 'rule book'. Normally, it is relatively easy to agree and classify most of the applications into the quadrants, although there are always some where discussion, based on different perceptions of their role and contribution is necessary.

If agreement cannot be reached, it often means that the 'system' needs to be considered at a lower level, in terms of the main functions it performs. For example, an Accounts Receivable system may consist of

Box 7.1 Classifying the applications in the portfolio

Questions

If the development* succeeds, will it:

(a)	Result in a clear competitive advantage for the business?	Yes/No
(b)	Enable the achievement of specific business objectives and/or critical success factors?	Yes/No
(c)	Overcome known business disadvantages in relation to competitors?	Yes/No
(d)	Avoid foreseeable business risks becoming major problems in the near future?	Yes/No
(e)	Improve the productivity of the business and, hence, reduce long-term costs?	Yes/No
(f)	Enable the organization to meet statutory requirements?	Yes/No
(g)	Provide benefits not yet known, but may result in (a) or (b) above?	Yes/No

* For existing applications the question is, is the application delivering benefits that . . .'

Interpretation

In answering the questions above, the reasons for the judgement should be stated. The table below shows how the answers can be interpreted and the application classified, based on whether or not any Yes answers appear in a column.

If more questions produce a Yes answer in any one column (i.e. the application appears to be in more than one category), then it should be reassessed by splitting it into its major components and considering each of them in the same way (i.e. the application should be broken down into subprojects). If this is not done, the risks of failure will increase dramatically due to the mixed objectives and the confusion that it can cause once the project proceeds.

	High potential	*Strategic*	*Key operational*	*Support*
(a)		Yes (i)		
(b)		Yes (i)		
(c)			Yes	
(d)			Yes	
(e)				Yes
(f)			Yes (ii)	Yes (ii)
(g)	Yes			

(i)	If either applies, the supplementary question is then, 'Is it clear what the business benefits are and how they can be obtained?' If Yes it is *Strategic*, if No it is *High potential*.	Yes/No
(ii)	To clarify which it is, the following question should be asked, 'Will failure to comply lead to significant business risks (be specific about the risk)?' If Yes it is *Key operational*, if No it is *Support*.	Yes/No

several business processes or subprocesses, some of which may be more business critical than others—bad-debt control may be key operational, whereas statement production is support. Although many applications are often provided via large packages (e.g. ERP and CRM software), the purpose of the analysis is still to classify the business activities that the package covers (e.g. order processing, purchasing), rather than the package itself. An ERP package can deliver applications in all quadrants, depending on the competitive positioning, the business strategy and the maturity of IS/IT development in the organization.

It also follows that the portfolio is not a way of classifying technologies—email, groupware, intranets, the Internet and a data warehouse can all be used for a variety of applications, making different contributions to different business activities. And to reiterate a point made in Chapter 1, an application utilizing cutting-edge technology does not imply that it is automatically classified as strategic—classification must be based on business contribution.

An example portfolio for a manufacturing company, produced using the question set in Box 7.1 and showing a simplified version of the SWOT analysis described above, is shown in Figure 7.3.

Reconciling Demand and Supply Issues in the Applications Portfolio

Before considering the best approaches to managing the applications in the different segments, it is important to understand the key differences in the rationale for the types of application and the resulting issues to be addressed in implementation. Discussion in Chapters 4–6 considered what might be described as the driving forces for applications in each segment of the portfolio (i.e. *why* they are being developed and *how* eventual success or failure will be determined). They can be translated into some critical requirements to be satisfied in the delivery of the application. These key issues are described in Table 7.2.

STRATEGIC	HIGH POTENTIAL
* Direct Marketing and Telesales system ** Advertising and Promotion-Campaign Management ** Sales forecasting/Market analysis ? Customer Relationship Management	** e-Procurement (general items) ? On-line customer specification system ** Product tracking/traceability ? Product profitability analysis ** Data warehouse-customer analysis
* Product database/Inventory Management, Manufacturing Requirements Planning[1] * Order processing, Dispatch, Invoicing, etc.[1] * Production control * Purchasing-materials ( ) Costing systems (activity and product) ( ) Sales analysis[1] * Warehouse Management * Wholesaler EDI (ordering, etc.), etc.	* Payroll and Personnel systems * Ledgers - Receivables[1] - Payables[1] * General Ledger and Budgeting[1] * Office systems ( ) Purchasing-general[1] * Samples Management etc.
KEY OPERATIONAL	SUPPORT

Key * Existing system is satisfactory
( ) Existing system needs improvement
** Planned system
? Potential system

(Note [1] - applications carried out by SAP or planned to be)

Figure 7.3 *Example portfolio for a manufacturing company*

To ensure overall success, it is important that decisions about *how* to implement the system (e.g. package or bespoke development) are directly related to decisions about *what* is required. Both of them have to derive as clearly as possible from the initial decision making on *why* the investment is being made, in terms of the contribution required. Albeit somewhat simplistically, Figure 7.4 attempts to pose simple questions that the chosen implementation strategy should address. Understanding the management implications of these questions offers guidance on how best to manage each application through its life cycle.

Figure 7.4 shows how the questions become more complex as we move around the matrix. For support applications, the general objective is clear (*why* = efficiency) and *what* needs to be improved is determined by existing tasks and activities. The main question is *how* to do that successfully, in terms of the most cost-effective use of IT. For key operational applications, the *how* question still has to be addressed, but in addition

Table 7.2 *Some key issues in the segments of the portfolio*

	Driving forces	*Critical requirements*
High potential	New business ideas or technological opportunity Individual initiative—owned by a 'product champion' Need to demonstrate the value or otherwise of the idea	Rapid evaluation of prototypes and avoid wasting effort/resources on failures Understand the potential benefits (and the economics) in relation to business strategy Identify the best way to proceed—the next step
Strategic	Market requirements, competitive pressures or other external forces Business objectives, success factors and vision of how to achieve them Obtaining an advantage and then sustaining it	Rapid development to meet the business objective and realize benefits within the window of opportunity Flexible system that can be adapted in the future as the business evolves Link to an associated business initiative to sustain commitment
Key operational	Improving the performance of existing activities (speed, accuracy, economics) Integration of data and systems to avoid duplication, inconsistency, and misinformation Avoiding a business disadvantage or allowing a business risk to become critical/comply with industry legislation	High-quality, long-life solutions and effective data management Balancing costs with benefits and business risks—identify the best solution Evaluation of options available by objective feasibility study
Support	Improved productivity/efficiency of specific (often localized) business tasks General legislation Most cost-effective use of IS/IT funds and resources available	Low-cost, long-term solutions—often packaged software to satisfy most needs Compromise the needs to the software available Objective cost/benefit analysis to reduce financial risk and then control costs carefully

STRATEGIC		HIGH POTENTIAL	
WHY	do we want to do it in strategic terms?	WHY?	- not clear
			and/or
WHAT	does the system need to do to gain the advantage?	WHAT?	- not certain
			and/or
HOW	best to do it?	HOW?	- not yet known
Why	to improve performance and avoid disadvantage	Why	to reduce costs by improving efficiency
WHAT	actually has to improve and by how much?	What	of existing necessary tasks
HOW	best to do it?	HOW	best to do it?
KEY OPERATIONAL		SUPPORT	

Figure 7.4 *Key questions on the applications portfolio*

considerable thought may be needed to define specifically *what* has to be done, and to which systems, to avoid potential disadvantage (*why* we need to do it). Again, both *what* and *how* questions need to be resolved in strategic applications, but in addition we need to clearly understand *why* we wish to do it in terms of the business strategy. Strategic applications require creative thinking and will cause change, probably externally as well as internally, and the reasons for and intended benefits of such changes must be agreed on. By definition, the strategic systems cannot be copied from others (since we will already be potentially disadvantaged!), hence their rationale has to derive explicitly and coherently from the strategy of the organization. If one or two of the *why*, *what* or *how* questions is unanswered, it implies that the application is high potential, and appropriate evaluation is needed to answer the remaining questions before making a large-scale investment.

GENERIC APPLICATION MANAGEMENT STRATEGIES

Given the variety of factors affecting success in the different segments and the business consequences of success or failure, no single implementation approach is likely to deal effectively with the range of issues involved. Equally, adopting a unique approach to each and every new development

will lead to a degree of chaos and probably result in as many failures as successes. A limited set that meets the majority of requirements and is well understood throughout the organization is more likely to enable the best approach to be selected in each instance and increase the chances of success.

Based on extensive observation of the realities of IS/IT management processes in many organizations, Parsons[11] described five strategies that are prevalent as the means by which organizations link the management of IS/IT to the corporate or business management processes. These 'linking strategies' are 'general frameworks which guide the opportunities for IT which are identified, the IT resources which are developed, the rate at which new technologies are adopted, the level of impact for IT within the firm, etc.'

They are 'the central tendencies which firms use to guide IT within the business'. As they are 'general frameworks,' the term 'generic strategies' is used in the discussion below. They are essentially alternative strategies for the implementation of IS/IT, ensuring that the nature of the demand is matched by the appropriate means of supply. How these implementation strategies can be aligned and reconciled with Earl's planning approaches will be considered on pages 321–323.

Parsons described the characteristics and implications of each strategy in detail, and they are summarized in Table 7.3. As can be seen from the table, the strategies define different roles and responsibilities for the three key parties involved in enabling successful implementation:

- executive management;
- line management: functional or process managers and users of the systems;
- IS/IT specialists: whether or not they are internal to the organization (centrally located or in business areas) or external.

As such, the strategies are behavioural and each set of behaviours will cause certain effects. The effects required are determined by the nature of the contribution of applications in the portfolio—the generic strategies, therefore, are ways of causing the right effects to occur.

Parson's strategies are: centrally planned, leading edge, free market, monopoly and scarce resource. They are well titled, since the very names evoke a basic understanding of the attitudes and behaviour that each is likely to produce. The key points of each, and their pros and cons, will be outlined at the same time as considering how they relate to the applications portfolio.

Table 7.3 *Rationale and requirements for generic strategies* (source: *after Parsons*)

	Centrally planned	*Leading edge*	*Free market*	*Monopoly*	*Scarce resource*
Management rationale	Central coordination of all requirements will produce better decision making	Technology can create business advantages and risks are worth taking	Market makes the best decisions and users are responsible for business results Integration is not critical	Information is a corporate good and an integrated resource for users to employ	Information is a limited resource and its development must be clearly justified
Organizational requirements	Knowledgeable and involved senior management Integrated planning of IS/IT within the business planning process	Commitment of funds and resources Innovative IS/IT management Strong technical skills	Knowledgeable users Accountability for IS/IT at business or functional level Willingness to duplicate effort Loose IT budget control	User acceptance of the philosophy Policies to force through single sourcing Good forecasting of resource usage	Tight budgetary control control of all IS/IT expenses Policies for controlling IS/IT and users
IT role	Provide services to match the business demands by working closely with business managers	Push forward boundaries of technology use on all fronts	Competitive and probably profit centre—intended to achieve a return on its resources	To satisfy users' requirements as they arise, but non-directive in terms of the uses of IS/IT	Make best use of a limited resource by tight cost control of expenses and projects. Justify capital investment projects
Line managers and users role	Identify the potential of IS/IT to meet business needs at all levels of the organization	Use the technology and identify the advantages it offers	Identify, source and control IS/IT developments	Understand needs and present them to central utility to obtain resources	Identify and cost-justify projects Passive unless benefits are identified

Centrally Planned

This generic strategy implies that senior and executive management need to be fully aware of the development, due to its potential impact on the future business strategy. It is therefore most appropriate for *strategic* systems. Ensuring success in such circumstances demands the attention of senior management, to ensure that the objectives are met and that the necessary resources are applied to deliver the solution in the time required. Most strategic developments are likely to span a number of business areas, and, while the nature of the system can often be easily defined in outline, it will be its uniqueness and its close fit to the business strategy that will deliver the business advantages. To gain those advantages, it is almost inevitable that changes to business practices and even organization structure will be necessary.

To meet all these requirements, a 'task force' approach is best suited. Led by a senior business manager, the team will need dedicated, preferably full-time, high-quality business resources, which have excellent knowledge of the areas affected and the authority to agree to business changes. Equally, it will need good IS/IT skills and knowledge in the team to design the system and manage the technical aspects of its implementation. This dedicated team require direct access to top management to resolve issues that will undoubtedly arise during the development. Subject to this senior management agreement, the team has the authority to decide both what the system will do and how, in business and IT terms, that will be achieved. It is likely that the design and development will be iterative, comparing possible solutions with emerging or changing requirements. This requires very close working relationships among the members of the team, individuals' contributions depending more on their knowledge than formally designated roles.

Although the idea of a dedicated team is attractive, it is often difficult to achieve successfully in many organizations. The people it requires are often the most valuable in their existing jobs and are not readily given up by their functional management for the duration of the project. Even though it may not be the most efficient use of skilled and knowledgeable people, it is a very effective way of achieving clear objectives in a tight timescale. The need for key people dedicated to such teams may also limit the number of strategic developments that can be undertaken at any one time, since such key people are often in short supply. It is better to reschedule the projects based on the availability of key resources than to spread the resource too thinly or substitute lower-calibre or less experienced people. This centrally planned strategy addresses the needs of strategic applications most effectively, but it could be used in certain circumstances to carry out a short, sharp evaluation of a high potential

opportunity or even attack a key operational development where the business faces the prospect of serious short-term disadvantage (e.g. Y2K compliance or Euro conversion).

Leading Edge

With this strategy, the senior management of the organization believes that, by adopting information technology that is 'leading edge' in the context of its industry, it should be able to gain some business advantage. It follows that they must be willing to fund some experimentation to evaluate technologies and ideas *and* accept that not all of the evaluations will succeed. While the new technologies may be identified by IT specialists, the evaluation should be in relation to some potential business idea or need and carried out in conjunction with the business. The objective is not to understand the technology for its own sake. Alternatively, the lead may come from the business, through seeing a technology in use elsewhere that may be potentially applicable for the organization. While that business 'vision' may be appropriate, IT specialists need to be involved in the evaluation, to provide an objective assessment of the capabilities of the technology and determine the longer-term implications to the organization of adopting a particular technology. This is essential, to counterbalance the often enthusiastic business user who has fallen prey to the persuasive pitch of a professional IT salesperson!

While the technology is 'brand new' to the organization, it should be confined to the *high potential* box for evaluation. It is very high risk to apply untried technology in any other segment of the matrix. Once evaluated, it may well be that the technology has significant potential for the business and becomes part of a strategic application. Alternatively, it may not, and it would be prudent if the technology is only relevant to key operational or support needs to proceed more carefully in line with the pace of adoption of technology in the industry. If there is no advantage to be gained, it is perhaps best to let others take the risks.

Free Market

The strategy that follows is 'monopoly' and, before considering the free market strategy in more detail, it is worth clarifying the key differences between the two in terms of the decision-making roles of the three parties involved. Table 7.4 attempts to do this.

The philosophy behind the free market approach is that line managers are accountable for the performance of the business activities within their area of responsibility. As part of that responsibility, subject to their normal degree of authority, they should be able to make beneficial

Table 7.4 *Free market versus monopoly strategies—key differences (*N.B. *In some cases, the Monopoly may be a combination of IT specialists and a particular function [e.g. for accounting systems])*

		Free market	*Monopoly*
Demand	Who decides *what* is done and whether it is done—the IS decision	Line or functional management	Senior management based on needs agreed by line management
Supply	Who decides *how* it will be done in terms of the IT approach	Line or functional management with or without advice from IT specialists	IT specialists with endorsement of senior management (IT can veto 'unacceptable' solutions)

decisions about IS and IT and not be hindered in any way by another group in achieving their performance targets. The alternative view, expressed by the monopoly philosophy, is that, while line management decide what is needed subject to senior management agreement to resource those needs, it is best if there is central coordination and control of how those needs are met. These two apparently opposing views can be reconciled by understanding how each satisfies the issues in different parts of the portfolio.

The benefits of the free market strategy are that business problems are resolved by IS/IT solutions close to the problem. This leads to strong motivation to make the system work, design solutions that fit the problem better in terms of need, cost and time, and, in some cases, a degree of business-driven innovation in the use of IT. This is very attractive to strong line managers with clear targets and objectives for their function, although the longer-term issues and costs of supporting the resulting systems are often overlooked in the drive to deliver short-term results. The downside is clearly that, if everyone pursues such a strategy, integration of data and systems is extremely difficult and the organization will acquire a wide range of often incompatible hardware and software. The long-term costs of such a situation can become unacceptable, but—possibly even more critically—the business overall may be prevented from gaining strategic benefits from IS/IT, which largely arise from the integration of systems and information resources.

Against that background, the free market strategy, operated within some limits to the types of technology 'permitted' in the organization,

is most effective in producing many of the *support* systems needed by the various functions in the organization. It is also an appropriate strategy for some *high potential* evaluations—those driven by a business idea and that can be tested with limited IT help, to the point where the potential benefits can be understood. Beyond these two segments of the portfolio, it can be a dangerous and expensive strategy in the long term.

Monopoly

In many ways, monopoly is the opposite of free market, whereby the influence of the centralized IT management of supply options will standardize on solutions, to provide integration of data and systems and also to control the cost of technology to the organization. This may well mean that the most expedient and perhaps ideal solution in each case has to be compromised to enable the long-term best set of solutions for the organization to be achieved, at an acceptable overall cost. Each functional manager will not necessarily achieve the most cost-effective or timely satisfaction of his or her needs. This may cause resentment, unless there is a general understanding of how the various systems of the organizations interrelate across the functional areas. Often, this is because the IT monopoly has exceeded its brief and is setting priorities for what is done (probably because no one else will!), rather than optimizing how best to achieve all that needs to be done. Senior management must set the priorities to make best business use of the IT resource available or, if that is unsatisfactory to line managers, increase the size of the resource.

The positive attributes of the monopoly strategy are that, if it is well directed in terms of business priorities and if users are competent in specifying their needs, high quality, integrated, maintainable systems are procured or developed and then supported in an overall cost-effective way. This is what is required for *key operational* systems, where a low-risk, controlled approach to the development process is essential to avoid systems failure and consequent disadvantage. The monopoly strategy can be adopted for support systems, but may produce relatively high-cost solutions where cheaper, less comprehensive options would have sufficed.

Scarce Resource

This is essentially a financial strategy that controls the spend on IT through a budget limitation, within which those investments that provide the greatest return for the spend will get priority. Each investment should be financially justified and the most cost-effective solution to deliver economic benefits should be selected. Expenses are then tightly

controlled against the agreed budget to ensure that the maximum net financial benefit is delivered. This approach tends to promote local specific solutions to meet local needs, and militates against flexible or integrated solutions, which will always be more expensive. The emphasis on purely economically-justified use of IT is very appropriate for *support* applications, and may produce effective key operational systems in the short term but at the expense of longer-term opportunities derived from integration. It does not encourage innovative or speculative (i.e. high potential) uses of IT, and precludes many strategic investments due to the demand for quantified financial benefits to be detailed in advance. However, a limited budget for research and development (R&D) or *high potential* activities, allocated from the centre to innovative ideas, is a version of scarce resourcing to reduce overall R&D risks.

On the other hand, setting priorities on the basis of financial 'return on investment' criteria forces both users and IT to find the lowest-cost solution, based on long-term economics, and hence encourages the buying of packaged software that is normally available for most support applications. It is more cost-effective to modify business practice to use available software than to develop new software to satisfy non-critical tasks. The strategy does focus for good reason on the IT costs, and it should be complemented by an equally strong drive to ensure that all the claimed efficiency and economic benefits are realized. Often, this is not the case, and a full audit of many apparently financially-justified investments would reveal a very poor actual return.

The above outlines are meant to describe the key attributes of each strategy sufficiently to differentiate them and allow understanding of why each is more appropriate in a particular segment of the portfolio. In each case, the strategies can be seen to correlate closely with the application driving forces and requirements described in Table 7.2. Figure 7.5 summarizes that relationship. These strategies offer considerable guidance to management about options available and choices to be made if IS/IT investments are to be managed successfully—they are important 'principles' to be understood and employed.

There are many similarities between these generic strategies and the styles of management proposed by Simon[12] to address the nature and degree of change involved in projects. Most IS/IT developments now involve business change, of increasing extent and significance and uncertain outcome as investments become more strategic. Simon considered two particular dimensions—the balance of prescription versus discretion that the project team has in determining what to do and how, against the level of explicit knowledge in the organization of how to achieve success. This resulted in four management styles:

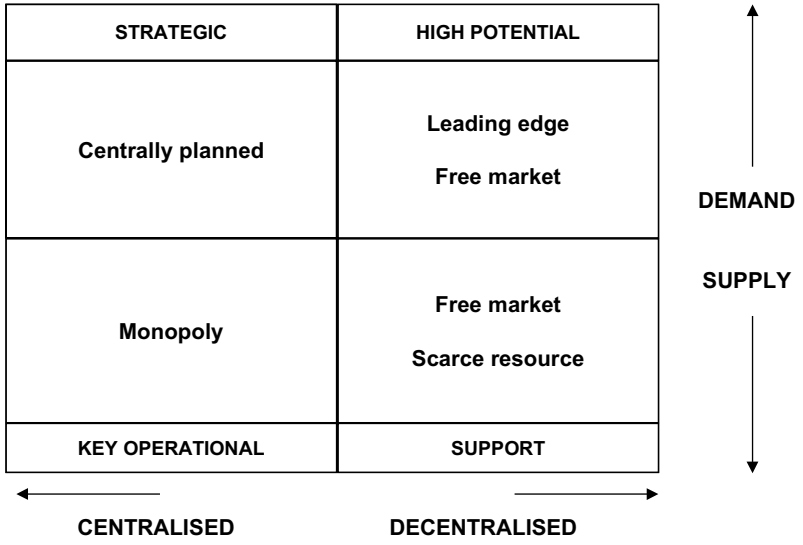

Figure 7.5 *Relationship of applications portfolio and generic IS strategies*

- *boundary control*, appropriate when the objectives and constraints are clear, but allows the project team discretion about how best to achieve the required outcome, which matches the change requirements of the support segment and correlates with aspects of *free market* and *scarce resourcing*;
- *diagnostic control*, implying a clear, prescriptive control based on sound knowledge of what has to be done to achieve performance targets, which is appropriate for key operational projects and implies similar levels of prescription as *monopoly*;
- a combination of Simon's *interactive control*, which is appropriate when there is a vision of the potential 'end point', but much to learn in order to define, scope and develop an appropriate solution and *belief system*, where the project team is expected to create a new and innovative application that will be closely congruent with the business strategy, relate to needs of the strategic investments—the uncertainties, change issues and learning required—and together are very similar to the concept of *central planning*;
- none of his styles is directly related to the R&D nature of the high potential segment, given that knowledge is the product rather than any implemented change.

In total, the strategies address the range of IS demand and IT supply issues in all segments and offer the balance of centralization and decen-

tralization needed. *Central planning* is a demand management strategy, whereas monopoly is essentially a supply management approach; both obviously mean strong centralization of control. *Free market* and *leading edge* are demand management approaches, letting users decide and/or new technology initiate demand. *Free market* can also be used to determine supply and is obviously decentralized, and *leading edge* is dependent mainly on external supplies of technology. *Scarce resource* is a supply management strategy and is decentralized in that, once the justification rules are set, the ability of any user function to satisfy them will determine what is done. Clearly, an organization with a comprehensive portfolio will use most of the strategies simultaneously.

Using Generic Strategies in Developing the IS/IT Strategy

The generic strategies have primarily two uses in the process of developing the IS/IT strategy:

1. *Diagnostic*—they are a way of assessing the current strategies being used—a clear way of expressing how IS/IT applications and investments are actually being managed. There is a strong correlation between the successful applications developed and the strategies adopted. Equally, the failure of many investments can be simply explained—the wrong generic strategy was adopted! The generic strategies can encapsulate the apparent complexity of the existing situation and, by describing it succinctly, explain it.
2. *Formulative*—once a future portfolio of applications can be identified using the various techniques described in earlier chapters and the strengths and weaknesses of the existing applications assessed, the generic strategies can be used to identify a migration path toward the mix of approaches required in future. It is superficially attractive to say that *central planning* is needed, but it might be an overkill and it is impossible to centrally plan everything. Allowing more freedom, using new technology or tighter, monopolistic control may be more appropriate in the short term. More rigorous scarce resourcing of support systems might release resources to be deployed on strategic systems. No definitive mixture can be prescribed for every situation, but the generic strategies provide a limited number of basic options from which to select the set that matches best the application portfolio requirements. This avoids the requirement to 'invent' the strategy entirely from the 'ground up'—it is easier to define the approach by modification from proven approaches to suit the particular need and then to identify the action necessary to achieve the migration path.

In a single business-unit company, these concepts are reasonably easy to apply and, as is discussed on pages 334–337, comparisons of portfolios and strategies can be made across business units to gain further benefits.

Relating Approaches to IS Strategy Formulation and the Generic Implementation Strategies

It would appear that there should be a logical relationship between how an organization plans for its IS investments, as described in Chapter 3 (based on Earl's work), and the approach it adopts for the implementation of the resulting applications. Although the two concepts of 'planning approaches' and 'generic strategies' are derived from different sources, there are some clear connections that can be drawn, and the evolution of the generic strategies used in many organizations can be reconciled with the development of IS/IT planning described by Earl. The correlation is not perfect and there are some anomalies:

- *Organization led* planning implies cross-functional views of IS to ensure that investments are targeted on the business objectives and key themes implied by these objectives. It follows that the *centrally planned* strategy for implementation would best maintain that strategic view.
- *Business led* with IS investments, driven by the plans for the particular business areas, should lead to uncovering high potential opportunities and, in due course, perhaps to strategic investments, but will also often lead to a plethora of applications that, in the overall business context, are actually support. This aligns closely with the *free market* strategy, which is good for enabling innovation but also appropriate for support systems. In many cases, because of the purely functional view taken of the systems, the organization fails to realize the full benefits and in practice only localized, support-type benefits materialize.
- The *administrative* approach to planning implies that the main objective is budgetary control of IS/IT, which can result in a *scarce resource* approach to implementation, whereby each investment is asked to justify a budget allocation via a financial case. Alternatively, one way of ensuring overall effective administration is to bring all the resources and costs together in one place, to plan and control the whole investment program through one budget centre, normally the IS function. This effectively creates a *monopoly* channel through which all investments are vetted. This does not imply financial constraints, merely centralized budgeting and monitoring of expenditure.

- *Method driven* planning involves a highly analytical and structured approach to determining the needs and priorities for investment, and it would seem prudent to follow through with the consistent, quality-based, highly-structured implementation process that *monopoly* brings. Both the planning approach and the implementation strategy are risk averse and work well where a long-term plan to improve the performance of relatively stable business activities is needed and feasible (i.e. key operational applications).
- *Technology led* planning and *leading edge* implementation approaches appear very similar, but also seem anomalous when placed in the portfolio context. Reconciliation is not obvious, given that Earl's work suggests that technology led is most relevant to identifying only support applications, whereas *leading edge* is best applied to high potential opportunities. The difference is one of perception and time. The technology led approach implies an incremental adoption of technology as it is available and proven, to enable technology efficiency to substitute for people's inefficiency (i.e. automation through technology). *Leading edge* implies using a relatively new, possibly unproven, technology to discover whether it has strategic benefit to the business. For example, technology led planning would lead to replacement of older, inefficient environments (such as mainframes and client server) with newer, more user-efficient environments (such as Web-enabled and browser-based systems). But *leading edge* would involve a completely new type of IT being evaluated (e.g. third generation mobile phones). This difficulty in reconciliation in some ways reflects a traditional dilemma in terms of how far 'technology-push' should be allowed to influence an organization's IS/IT strategy.

In terms of the evolution of IS strategic management, described in Chapter 3, many organizations develop or evolve their mix of planning and implementation strategies in the following way (see Figure 7.6):

- *Stage 1*—no coherent strategy—a mix of *free market*, *monopoly* and *scarce resource*—which is likely given the 'bottom-up' process, and the only planning is of technology supply.
- *Stage 2*—a monopolistic strategy tends to prevail, linked to the need for structure and integration related to the method driven planning used to avoid systems ineffectiveness.
- *Stage 3*—a combination of *monopoly* and *scarce resourcing* is common to provide the necessary controls of implementation processes and costs in line with the emphasis on the budget (administrative led).

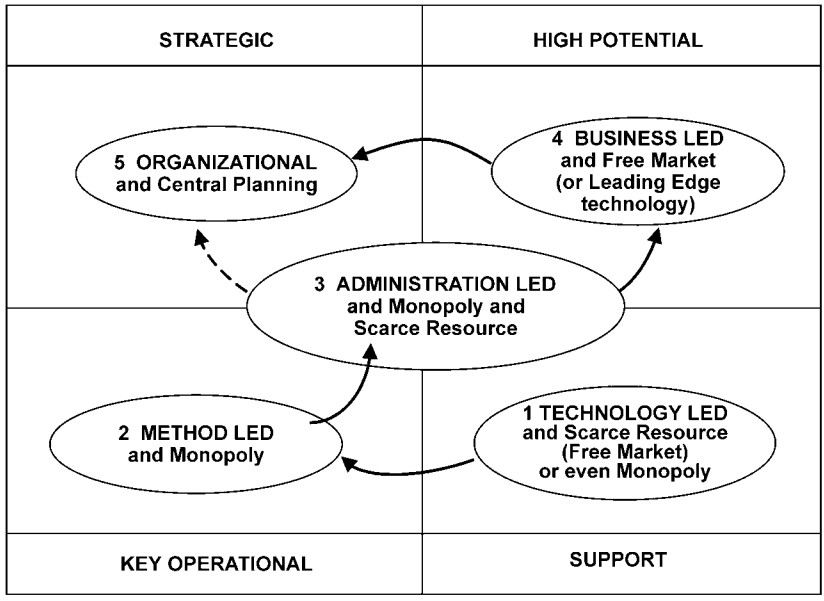

Figure 7.6 *Portfolios, planning and generic strategies evolution*

- *Stage 4*—users pursuing localized opportunities opens up *free market* activities in addition—which should be based on business led planning, in terms of local functional priorities. Alternatively, emerging new technologies provide the opportunity to innovate in creating new business processes or radically change existing ways of working. Linking the technology to a genuine business need is the first step in determining the benefits of adopting the technology.
- *Stage 5*—the use of the *centrally planned* strategy occurs for the implementation of strategic applications, as the organization identifies the links between its strategic themes and the role of IS/IT.

Those who succeed in the longer term are those who can understand, accommodate and use the required mixture of planning approaches and implementation strategies most effectively.

PORTFOLIO MANAGEMENT PRINCIPLES APPLIED TO THE APPLICATIONS PORTFOLIO

The obvious resemblance of the applications portfolio to the better known 'product portfolio' of the Boston Consulting Group and

customer/channel management portfolios has already been mentioned. The similarities are important, since products and IS/IT applications must be managed according to their contribution to the business over an extended life cycle. That contribution is determined by both internal and external factors—in the case of IS/IT, the external market-driven factors are becoming increasingly important. The lessons from 'other portfolios' have become more pertinent still as IS/IT becomes integral to products, services and relationships with customers and suppliers. Comparisons will be drawn directly with portfolios of products/services, though similar parallels exist with customer portfolios.

First, both applications and products have life cycles, and move around the matrix over time. High potential applications and wildcat products are both risk investments that need to be carefully assessed as to whether or not they are of strategic importance or can become star products. As the competitive balance is restored and the application is commonly in place across the industry, it becomes key operational, as a star product should become a cash cow when the market matures. Finally, as the industry moves on to a new competitive basis, applications may be of support value only, and, similarly, products move from cash cows to dogs eventually. It is important in both cases to avoid high potential or wildcat investments from drifting straight down into the support or dog quadrant, as a result of indecisive management or an inability to capitalize on any knowledge gained.

Second, both applications and products require investment funding. This is easily seen with products, where the cash generated by today's profitable products is reinvested in cash-hungry future products. For applications, this implies reinvesting the benefits derived from today's systems into new applications. What are these benefits? They are:

- skills, knowledge and experienced resources;
- the capability to develop and manage complex business systems and the evolving 'IT supply chain';
- management commitment to the use of IS/IT in the business, based on successes achieved and a perception of the value of IS/IT investments;
- data (or information) held in the existing applications, if well organized, is a potential source of advantage if exploited through its use in strategic applications.

Lack of reinvestment will in all cases cause the value of previous investments to depreciate, steadily but surely, over time.

Third, both applications and products need to be managed and have resources allocated in accordance with their business importance, not

their technical or operational peculiarities. Management capability and resources are normally in short supply, and need to be continuously reallocated to obtain the best business results and maximum benefits from the overall portfolio. Balancing the available resources and expertise to match the evolving portfolio needs is essential to sustain success.

Overall, the main reason the product portfolio model offers useful input to the application portfolio is that it reflects the competitive business environment. The model was developed to assist in managing and planning in an uncertain, market-driven environment, where management decisions are made within a total environment that can only be influenced, not determined. IS/IT is also subject to the forces of the marketplace—external parameters now define the effectiveness of an organization's IS/IT management. Of the various analyses and conclusions that can be drawn from business portfolio models, some have particular relevance to the application portfolio and, hence, provide valuable insights for managing IS/IT. In their book, Hartman and Sifonis[13] draw very similar parallels in describing the issues and approaches in their 'e-business value matrix'.

Figure 7.7 superimposes the product and applications portfolio matrices. Maximizing the long-term contribution of products depends on successful management in the relevant quadrant and successful transition management across quadrants, as determined by prevailing market

STRATEGIC *(STARS)*	**HIGH POTENTIAL** *(WILDCATS)*
- Continuous innovation - Vertical integration - High value-added	- Process research and design - Minimal integration - Cost control
- Defensive innovation - Effective resource utilization - High quality	- Disinvest/Rationalize - Efficiency - Sustained quality
KEY OPERATIONAL *(CASH COWS)*	**SUPPORT** *(DOGS)*

Figure 7.7 *The business/systems portfolio matrix*

forces. IS application management depends on the same two factors. The particular parallels will be drawn by following the evolution of an application around the matrix.

High Potential (Wildcats)

IS/IT high potential applications resemble wildcat products due to the degree of uncertainty of success—the amount of risk they involve. Many will fail. Identifying and then transforming the successes into the next phase of the life cycle is the objective. This implies dealing effectively with the failures and not pouring good money and resources after bad. Three particular approaches to management are appropriate to achieving this:

- *Process R&D—not 'product'*. From the business lessons: how to make, market, distribute, resource the new product, not just achieve the ultimate in product design. A common weakness in many firms is 'over-engineering' products—satisfying the designer, not the customer! A similar problem exists in IS—satisfying the technical professional, not the user. Any prototyping or pilot implementation of an application should be undertaken to find out how the organization, and/or its trading partners, can benefit most from a new use of IT, not to discover all that the technology can do. Many prototypes of electronic commerce, knowledge management and CRM systems have failed—not because there were no benefits to be gained from the technology, but because the organization failed to discover how to implement it in the way that would deliver those benefits.
- *Minimal integration*. While being evaluated, risky ventures should be separated from mainline activities. Should they fail, aspects of the business should not have become dependent on them and, at low cost, the prototype can be aborted. Neither will the evaluation be clouded by issues not directly relevant to it. A key part of the evaluation is to decide how the integration can best be achieved—therefore, any initial integration could preclude the most effective options. Often, new IT applications produce disappointing results due to evaluations that are prejudiced by existing activities to which they are attached. Non-separation of new products has caused similar problems—contribution to the business being impossible to assess, and commitments having been undertaken that make decisions to pull out expensive.
- *Cost control*. The only common factor that applies across prototypes is money. A budget is the only consistent link with normal management processes, where the unknown is being explored. This need for

strict budget control reinforces the need for non-integration to ensure that the specific financial implications can be assessed. To improve the cost control further, it is usually worth restricting the time allowed for evaluation, even though it is difficult to predict how long it will take when it is a unique R&D project. Most evaluations can be made in three to six months: sufficient to determine whether further investment is worthwhile. Even if the work is not 'finished' (it never will be!), it is better to review the progress formally after, say, three months and decide whether further work is still needed or whether the evaluation has provided sufficient evidence to proceed. Strong cost-based management is the only effective control available, and it must be understood that the 'investment' may have to be written off. It is better if these evaluations are funded from an R&D budget—either specific to IS/IT or a business R&D fund—and not compete with funds required for the rest of the portfolio.

As new technology options are now emerging faster than ever, even relatively conservative organizations will need to 'experiment' more in the high potential segment to avoid falling behind their competitors in IT use. Successful management of IS/IT 'R&D' is becoming an increasingly important aspect of most firms' strategies, but one with which many are unfamiliar.

Strategic (Stars)

A star product or strategic application is one that the company is dependent upon for future success in a competitive, changing marketplace, where any advantage gained can be expected to be eroded quickly. The value of the application can only be judged by its effectiveness *vis-à-vis* competitors. Using the Internet to link customers directly into an organization's order-taking systems will only work if it is of value to the customer—a judgement that the firm can influence, but the customer will make!

Again, particular approaches should be adopted:

- *Continuous innovation*—this applies to what the system does and how it does it, to increase its value-added as an integral part of the business. These improvements will be business driven, based on the need to sustain or increase the perceived advantages. Whether to spend more money will be a business manager's decision, based not simply on return-on-investment calculations, but on the risk to the business if the system fails to stay ahead of the competition. A website offering access for buying products may become obsolete

very quickly if a competitor offers advice and other service features that the customer finds more valuable or easier to use.

- *High value-added and vertical integration*—in order to achieve appropriate innovation, the business manager has to understand how the system can enhance the business process and then have the capability to make further changes to increase the value created, or improve process performance, as and when required. This implies business control of IS/IT resources and the right to satisfy the unique needs of the particular situation without prevarication or accepting lower value-added compromises. The processes of systems management should be vertically integrated with the business unit management to obtain maximum strategic leverage from the system or the information it delivers. Most applications in the strategic box are normally associated with a highly information-intensive part of the business, and the business manager will not be able to take full advantage if he or she has insufficient discretion over IS/IT deployment.

This process of value-adding is expensive and resource intensive and is only justified where IS/IT can change the business performance to gain a specific, sustainable advantage. As the rest of the industry catches up, diminishing returns will result from adding further value and greater returns can be obtained by reducing the cost of matching performance to industry norms.

Key Operational (Cash Cows)

As with its cash cows, an organization expects its key operational systems to make a significant and lasting contribution to the business. This depends on keeping the product or system in line with current market and business demands in the most cost-effective way. The particular business lessons in this case are:

- *Defensive innovation*—the system should only be enhanced or redeveloped in response to changes in the business that threaten to put the business at risk through a reduction of competitive capability (i.e. avoiding disadvantage). This risk should be quantified as far as possible to ensure that the expenditure involved gives a net benefit over time. Deciding on further investment now requires a joint evaluation—users deciding the benefit or risk of action or inaction and IT professionals identifying the costs and consequences of any action.
- *High quality*—key operational systems are expected to have an extended life over which they make a significant business contribu-

tion. Compromises on system quality will reduce that effective economic life due to increased user costs for 'workarounds' to overcome system deficiencies or increased IT 'maintenance' costs due to increasing numbers of systems problems. In the long term, the low cost of support depends on professional quality management—data and processing integrity and accurate integration of the system with other key operational systems and databases as well as related processes and procedures.

- *Effective resource utilization*—key operational systems cannot be afforded the dedication of resources given to strategic systems—it is not justified. This implies the integration of the support for the system with other systems—sharing resources and expertise to reduce the costs. This is a familiar lesson from systems development—transferring the management of a system from a dedicated development team to a general support group after implementation. This reduces the cost, improves development quality control and discourages continuing poorly-justified 'enhancements'. There is another important reason: integrating the system's support activities will allow opportunities to reduce costs further from general improvements in IT infrastructure capacity and capability, whose justification is based on the number and range of applications that use it.

The overall approach to managing key operational systems is to reduce costs while sustaining the business value derived from the use of the system. Integration of systems and resources with other applications will provide this net gain.

Support (Dogs)

Support systems, like dog products, are not critical to an organization's future, unless they waste valuable resources or the marketplace changes unexpectedly. The business lessons are therefore:

- *Disinvest/rationalize*—reducing the organization's commitments to systems can be achieved in a number of ways: by using software packages and/or outsourcing their operation and support. Each involves the substitution of resources—money for scarce skills—and the decision is essentially a financial one, which often gives very good returns. Alternative solutions are available for these applications, because they offer no competitive advantage and service/package providers can make a profit from the range and volume of similar applications in many companies.

- *Sustained quality and efficiency*—the quality of the system should be maintained in proportion to the costs of failure and, if necessary, calculated risks should be taken, based on the efficiency of resource use involved. In general, the system should not be enhanced unless there is a very demonstrable economic case—to ensure that resources are only consumed where a return is certain. The disinvestment process discussed above will automatically reduce the pace of enhancement to that of the generally-available service or package. The general rule here is to adjust the business activity to fit the package, not the other way round—or costs will increase dramatically, not reduce!

A number of immediate observations can be made from the above analysis:

- The rate of enhancement to any application should reduce as it progresses around the life cycle.
- The justification for application investment becomes more quantifiable over the evolution, and financial evaluation becomes both more meaningful and more decisive in the key operational and support quadrants. This is dealt with in more depth in Chapter 9.
- To achieve the appropriate balance of resource use to business contribution, different management approaches are required in the different quadrants—which implies that the system may have to be rebuilt or at least reimplemented when it crosses the boundaries to optimize the net organizational benefits. For instance, the degree of enhancement and probable expediency of change control in the strategic quadrant can militate against effective resource utilization when it becomes key operational, unless some consolidation or rationalization is undertaken during the transfer.

Some of the key issues described above that have to be considered as an application migrates around the portfolio are summarized in Figure 7.8.

While the migration from high potential via strategic to key operational is the most common sequence and delivers the maximum contribution over time, mismanagement in the early stages can reverse the logic and outcome. This occurs most frequently when applications using a new technology are allowed to evolve without effective management. Based on studies of Intranet applications,[14] a number of examples showed a different evolution:

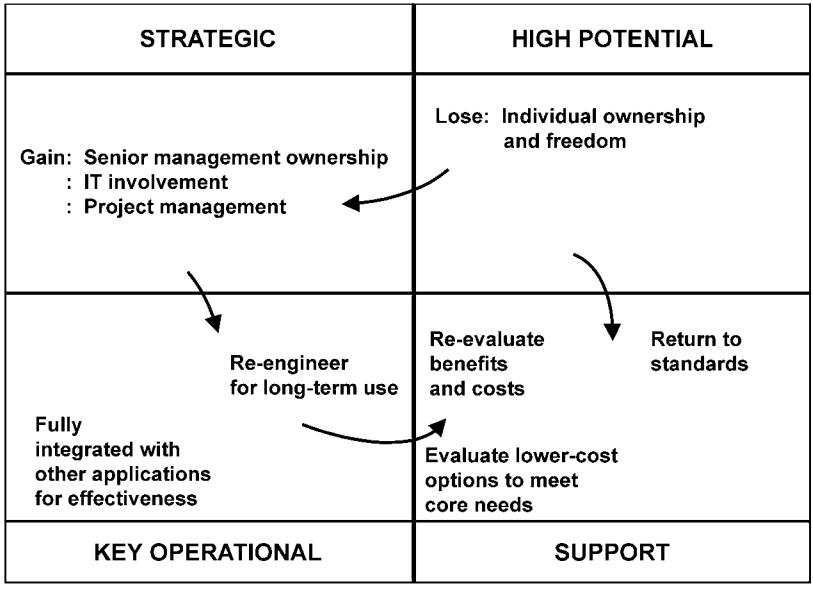

Figure 7.8 *Key issues in managing the evolution of an application over time*

- Initial experimentation (high potential) enabled knowledge-sharing applications to be developed, saving time, etc., but the benefits were not 'strategic'. Therefore, they soon became support applications; they were still used, but the costs of support were minimized.
- Over time, due to their ease of use, the applications were relied upon as a source of operational information, even though the 'content' was not managed in a disciplined way—there were no procedures for maintenance or clear ownership of the components of the information base. Eventually, a major operational problem or failure occurred due to incorrect or out-of-date information content. Only then was the key role that the 'informal' information system was now fulfilling realized and appropriate disciplines, procedures and support resources put in place.

In one example, salespeople were selling services to customers based on information from the (informal) Intranet catalogue. The company no longer offered some of those services, but no procedure or control existed to remove the out-of-date information. Only when contracts were about to be signed did the customer (and salesperson) discover the problem. Several valuable contracts were lost! This is not an issue of Intranet-based applications, it can happen when informal, free market

management of applications appears in the key operational segment, due to a change in the business role of the system.

Application Management Styles

Another important concept developed from the product portfolio is how the management style should change during a product's life cycle in response to the evolving issues to be addressed. Since managers cannot be totally adaptive in style, this often implies changing the manager! Equally, different styles of management are required to successfully develop and deliver the different types of application in the portfolio. The lessons of product portfolio management offer significant guidance.

High potential applications require a similar style to wildcat products, namely entrepreneurial, to champion the application through phases of doubt or decide to stop if the potential is not realizable. 'Entrepreneurs' are highly motivated, expecting personal recognition of their success. At the same time, they recognize that they must not be judged to have failed by others and will either be adept at avoiding failure or be the first to decide it is not worth proceeding. Also, they do not obey 'the rules' and will cause change and innovation, which implies challenging preconceived ideas or ignoring or bypassing accepted custom and practice. This mode of operation is very appropriate for the high potential situation, but would be wholly inappropriate elsewhere in the matrix.

Strategic systems require more nurturing, to gain organizational acceptance through demonstrated contribution to future strategy. A style of 'developer' best describes the type of manager required: someone who will build a team and develop the resources necessary to achieve the task objectives. Other terms to describe this are 'organizational climber'—someone whose career ambitions will be met by being related to the achievement of organizational success—or 'empire builder'—a much maligned term! A developer is a planner who achieves results through others, a team manager who moulds the resource to match the needs of achieving the objective and who can be flexible to changing circumstances—adapting the means to achieve the end result.

Key operational systems require a different style of management entirely: that of a 'controller' who is risk-averse, wanting everything to be done correctly and failure never to occur. Assurance of success implies reducing risk to a minimum via strict adherence to procedure and standards, and building an organizational structure and mentality that is self-checking and control conscious. The best way of achieving quality control is to build it into the organization structure through job responsibilities and procedures. The controller approach is essentially inflexible

and resistant to change, since change causes confusion and error! Within clearly defined parameters, the status quo will be defended and requirements carefully scrutinized and evaluated, before changes will be allowed, in order to prevent business problems and even serious disadvantages due to systems failure.

Support applications are ideally best managed by 'caretakers', who get their satisfaction from achieving 'the impossible, with no resources, repeatedly' and have to be congratulated for it! It is a reactive, problem-solving approach, where planning and resource management are less important than getting the job done expediently and efficiently to the satisfaction of the client. This implies a multitasking, flexible approach to achieving results that are not of any strategic impact, but will cause a major distraction from more strategic matters if not dealt with in a timely and adept manner. Support systems have no great future potential impact, but can be a constant source of irritation if mismanaged.

An entrepreneur is impatient to achieve results to demonstrate his or her personal capability, whereas a developer has longer-term career aims of achieving success through the organization. A controller wants to prevent the failure of the organization and a caretaker wants to be recognized as an effective user of limited resources in solving problems. The nature of these management styles reflects the generic strategies required to manage the various components of the portfolio:

- an entrepreneur is a free marketeer, who pays little attention to established procedure;
- a developer is a central planner, close to the organizational goals, who builds resources to achieve results;
- a controller is a monopolist, uncomfortable with anything outside his or her control;
- a caretaker is a scarce resourcer, proving that he or she can achieve as much with less!

If the strategy is to be achieved overall, then the appropriate management styles must be adopted; the strategy will not be achieved by managers who are 'square pegs in round holes'—a developer managing in the support segment will produce ever larger, more significant versions of relatively inconsequential systems; a controller expected to evaluate a high potential opportunity will never take the first risk, and so on. It must be remembered that all these roles are important and each has a major part to play in managing a complex portfolio over time. The basic attributes are summarized in Figure 7.9.

STRATEGIC	HIGH POTENTIAL
DEVELOPER - Organization goal seeker - Risk accommodating - 'Central planner'	ENTREPRENEUR - Personal achiever - Risk taker - 'Free marketeer'
CONTROLLER - Long term/quality solutions, stability - Risk reducing - 'Monopolist'	CARETAKER - Immediate/Efficient solutions - Risk avoiding - 'Scarce resourcer'
KEY OPERATIONAL	SUPPORT

Figure 7.9 *Management styles*

MANAGING APPLICATION PORTFOLIOS IN MULTI-UNIT ORGANIZATIONS

Once IS strategies for each business unit can be expressed in terms of the application portfolio, it becomes easier to identify possible mutual benefits across the organization, by taking advantage of successful innovations as well as meeting similar needs more economically. Figure 7.10 depicts the minimum gains to be made by a coordinated approach across the organization, when the applications portfolios are compared across business units.

In the support segment, even if the businesses are diverse, the applications are likely to address similar administrative requirements, and packages are a common choice. At worst, a limited number of packages should be used; at best, a single, common suite of applications could be used. This will obviously depend on the diversity of the types of business. For example, manufacturing and financial services organizations will require different systems, but several types of retail companies in different market sectors could easily use common accounting systems.

The same logic applies throughout the matrix, but the benefits of commonality of actual applications are likely to decrease as we move from support to key operational to strategic, although in the strategic

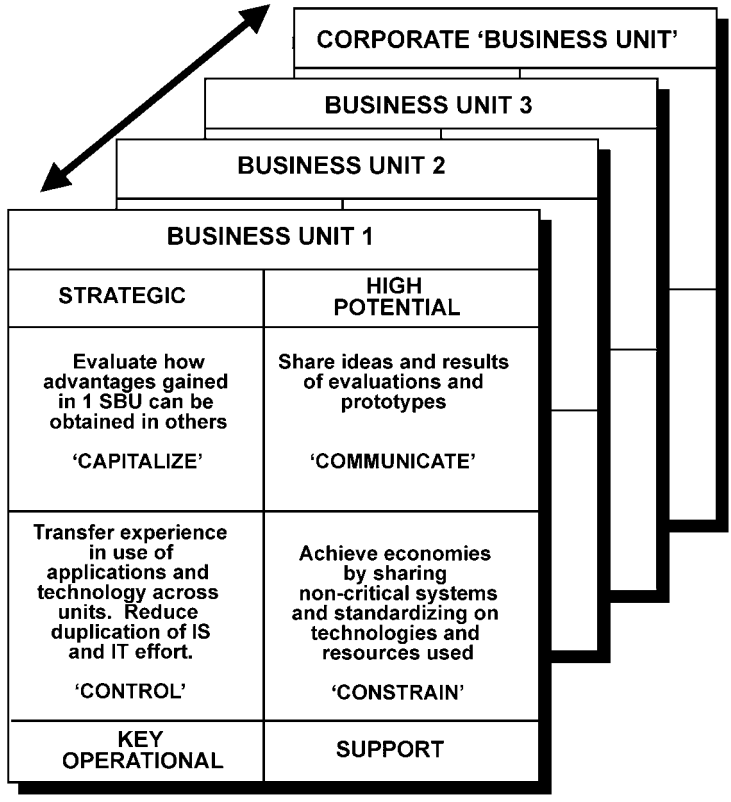

Figure 7.10 *Portfolio management in a multi-business-unit organization*

quadrant benefits may be realizable through different implementations of the same idea. Transferring the knowledge gained from one organization to another may accelerate the development of strategic applications. This implies business-based sharing of how to achieve the benefits available, even if the details of the applications vary. Links to suppliers, for instance, are likely to achieve similar benefits to manufacturing and retail companies.

It could well be that, due to the different state of development of the different industries in which the units operate, a key operational system in one business could provide a competitive advantage in another. One company was able to transfer a system that was well established for managing consumer goods inventories and distribution to a chemical industry business. The approach was new to the chemical industry and enabled that unit to gain an advantage through better customer service levels and lower stock holdings.

This kind of opportunity can only be identified if the existing and required future portfolios of the different businesses are compared, within the context of the competitive environments and strategies of those businesses. However, there is an inherent danger in this approach, if business units are 'forced' to accept systems from other units for largely economic reasons, without due recognition of their differing business situations, competitive priorities and organizational competencies.

The real objectives are to ensure that opportunities are not missed or that time, resources and funds are not needlessly wasted. This can only be achieved if a similar rationale has been used to define the portfolios. If the effort of the IS/IT strategy process is worthwhile, then additional work to build on or share ideas could yield significantly greater benefits and avoid considerable duplication of effort across the overall business.

There is consistency between the rationale for the degree of coordination advised for each segment with the planning and implementation approaches described on pages 311–318. The generic strategies can be used to summarize the actual or required relationship between the corporate body and the business units, and among those units. In a diversified conglomerate, evolving through acquisition and divestment of businesses, the corporate IS/IT generic strategy is likely to consist of a minimal centralized (monopolistic) component—perhaps financial control systems—with an otherwise free-market philosophy. This is appropriate to the business.

However, if the company is predominantly in one industry where synergy is a potential source of advantage, the business unit strategies are likely to be supplemented at a corporate level by some central planning of IS/IT applications and a monopolistic control over the ways of meeting key operational needs to avoid proliferation and incompatibility of solutions. Where the organization cannot benefit from vertical synergy, but consists of like types of company (e.g. manufacturing, retail or financial services), similarity of functional requirements might be more effectively or economically satisfied from a central utility (monopoly) or by 'monopolistic' management of outsourced supply, for those systems that are needed by many companies.

In Figure 7.10, the term *constrain* in the support segment implies corporate scarce resourcing for applications that are not unique in any of the units. Monopolistic *control* is suggested for key operational applications to reduce unnecessary diversity over time to enable both reduction in costs through effective resource use and to develop and sustain expertise in application operation and use. *Capitalizing* on strategic application success requires some (business) central planning across the units to determine whether and how the same benefits can accrue across the organization. Finally, while any corporate 'interference', however well

intended, can stifle innovation in the units, sharing knowledge of new technology, its capabilities and limitations—by ensuring the results of R&D work is made available to others—could increase the speed of exploitation and reduce wasted effort. The *communication* facilitation is probably best established at the corporate IT centre, via a 'bulletin board' or similar knowledge-sharing mechanism.

SUMMARY

This chapter has tried to demonstrate the rationale behind adopting an applications portfolio management concept as a core framework within the IS/IT strategies. The basic 2 × 2 matrix model has been explored from a variety of directions to identify the potential advice and guidance it can offer organizational and IS/IT management in defining, selecting and implementing the variety of applications required. While not all the advice is identical—after all, it has been derived from many diverse sources—it is never contradictory, and the patterns that emerge are generally consistent. It must be reasserted that the simple model does not reflect the full complexity of the IS/IT strategic management environment, but it does allow much of the complexity to be analysed to enable the issues and alternative solutions to be understood better.

From what has been said in this chapter, it follows that different approaches will be needed to deal with the detailed aspects of resourcing and technology development and deployment in the segments of the matrix:

- different development methodologies, processes and application development tools will be more or less appropriate;
- different degrees and types of involvement of executive and line management in IS/IT governance and projects;
- different IS organizational structures, services competencies and resourcing policies including procuring and supporting the required technologies;
- how IS/IT investments are justified/evaluated, prioritized and costs allocated—a singular approach will tend to produce one type of application to the exclusion of others.

These and other aspects of the issues of business and IS/IT management that enable the successful evolution of the portfolio will be considered in more depth in later chapters. The objective of the IS/IT strategy process is not to have a strategy document *per se*, but to develop and sustain the organization's ability to implement the ideal set of business applications

in the most effective way. This requires appropriate demand and supply management approaches in each segment and coherent means of migrating systems around the matrix in relation to their evolving business contribution.

ENDNOTES

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