4
IS/IT Strategic Analysis: Assessing and Understanding the Current Situation

The first three chapters have considered the evolution of IS/IT in organizations from a strategic perspective and outlined approaches to developing business and IS/IT strategies that can enable the required improvement in the integration of both. More specifically, in Chapter 3, 'what is involved' in establishing an IS/IT strategy process and its deliverables were examined against a background of the various issues affecting the process. This and the following chapter concentrate on determining the content and main deliverables of the IS strategy, comprising:

- analysis of the existing and expected future business and IS/IT environments and strategies;
- the organization's IS requirements arising out of the current business strategy, by aligning these requirements with stated business needs and initiatives;
- the future potential from IS/IT through identifying opportunities to impact the business strategy and significantly raise its competitive performance.

If both *strategic alignment* and *competitive impact* are being pursued, then, in practice, there will be considerable overlapping of the two threads of analysis. However, for ease of exposition, they are treated separately in this book. The derivation of the IS strategy by alignment with the business strategy is covered in this chapter. This is established through a combination of analytical and evaluative methods, although it

should be remembered that creative ideas can arise at any time in the strategic analysis. Chapter 5 will introduce concepts for the more creative dimension, by exploring external IS/IT opportunities, the competitive environment and the industry 'value system'. The techniques used in these analyses may in turn provide new insight into results from the more internally-focused analysis presented in this chapter.

In pursuing both alignment and impact, a thorough understanding of the business and technology environments, and of the apparent and expected opportunities and threats, is required, as well as a sound knowledge of how IS/IT may be applied innovatively to change the business along any one of a number of dimensions—strategy, structure, processes, culture, etc. It is also essential to build up a picture of the expected outcome, both in terms of the changes to be brought about through business and IS/IT initiatives, and the required changes to the IS/IT environment, both the application portfolio and the supporting IT infrastructure. An objective assessment of the strengths and weaknesses of the business overall and its IS/IT capability is also required.

Based on a clear understanding of the starting position, the future business perspective and the IS strategy, the gap in terms of IS/IT requirements can be analysed and an achievable migration plan constructed. This point is picked up in Chapter 6, where we bring together the various approaches considered in both this chapter and the next into an overall framework to determine the prioritized information systems requirements for the organization. It must be remembered that the focus at this stage is primarily on the business IS strategy (i.e. *what* is required—the needs and priorities from a business perspective). Later, the IT strategy (i.e. how to deliver it) will be addressed. Nevertheless, as the requirements are identified, the current ability of the organization to 'supply' or satisfy those requirements will inevitably be assessed. Hence, this part of the analysis will also focus on the capability of IT resources as reflected in the existing organization and practices, and in the current applications and information resources of the organization. The result of the IS strategy formulation is a target application portfolio that meets corporate and business needs and can be sustained in terms of technologies and resources. Various techniques can be used to achieve the mixture of fact finding and analysis that goes into determining the IS demand, and several of them are described in this chapter.

BUSINESS RE-ENGINEERING AND IS STRATEGY

One of the hottest concepts to arrive on the management agenda in recent years is that which has been labelled *business process re-engineering* or

BPR for short.[1] First articulated in the late 1980s as a result of research at the Massachusetts Institute of Technology,[2] it has become the means by which many organizations are seeking to emulate the transformations achieved by the early pioneers. Companies such as Ford, Hewlett Packard, First Mutual, Taco Bell, Hallmark Cards were shown to have achieved significant improvement in the performance of selected areas of their business by redesigning the processes through which work in organizations is performed.[3]

The redesign of business processes continues to be a popular approach taken by organizations to improve performance. While the concept has attracted negative press over the years, some of it warranted,[4] we find today that it often appears under a number of guises such as customer service initiative, e-procurement project or major cost reduction—all demanding significant redesign of business processes. While this book is not setting out to cover re-engineering approaches in any depth,[5] it is nevertheless pertinent to consider the subject alongside the development of an IS strategy, for a number of reasons:

- In developing the IS strategy, a thorough understanding of the business strategy is essential. Most re-engineering initiatives will spring from, and be part of, the business strategy.
- In many instances, the early work in developing an IS strategy is first to flesh out the details behind the headlines in the business strategy, and this means working with the business areas to help determine what those business initiatives will be and their expected contribution to business objectives. These could include re-engineering initiatives.
- Most, if not all, re-engineering initiatives have a significant IS/IT element, which will be accommodated in the IS strategy, and need to be allocated the same priority that the business places on the change program.
- There is a common need in both IS strategy development and business re-engineering to build up a model of the business as it currently exists and other potential models of how it will look following transformation or evolutionary change.
- Success in re-engineering, as with the development and implementation of an IS/IT strategy, demands a strong business–IS function partnership.[6]
- Designing or redesigning business processes to take advantage of IS/IT capabilities is essential if the traditional problems of automating poorly-designed processes or inefficient work practices through IT are to be avoided.

Much has been written about the role of IS/IT in business re-engineering. In particular, there are conflicting views as to whether IT is the driver for re-engineering, or an enabler or one of the means of implementation. Davenport and Short[7] argued for the first of these, although they recognize its role in the other two, insisting that two key questions must be asked:

- How can business processes be transformed using IT (based on a full understanding of the capabilities of IT)?
- How can IT support business processes?

Many organizations have not adequately or systematically addressed the first question, such that IT has barely been exploited at all in such situations. Teng and colleagues[8] suggest that IT is an enabler, but that its potential role should be overtly recognized and incorporated in an 'integrated business process redesign planning model'. This they describe as a 'policy loop', which combines business strategy and IS/IT strategy. Within this overall process are two subsidiary 'loops', one concerning business innovation (with little IS/IT involvement), the other dealing with implementation, where IS/IT becomes critical for achieving the benefits of change.

The relationship between IS/IT and BPR can be summed up as shown in Figure 4.1, whereby IS/IT has to be considered in different ways at the different stages of identifying, evaluating and implementing 'radical' process change. This enables a reconciliation of the fundamental questions of impact and alignment of IS/IT strategy development with the rationale for 're-engineering' initiatives. Table 4.1 summarizes these questions.

In the past, the most effective IS strategies have assiduously sought to be developed in line with the business strategy, so that change initiatives could be worked out on as broad a basis as possible, and certainly not confined to IT development work. The main difference between these and current business re-engineering schemes is often in the name applied to the program.

UNDERSTANDING THE CURRENT SITUATION

Understanding the current situation involves obtaining an in-depth understanding of the business strategy, the business and technology environments and the current status of IS/IT in the business. This makes it possible to determine the opportunities, threats and requirements inherent in the business strategy, and to recognize the strengths and

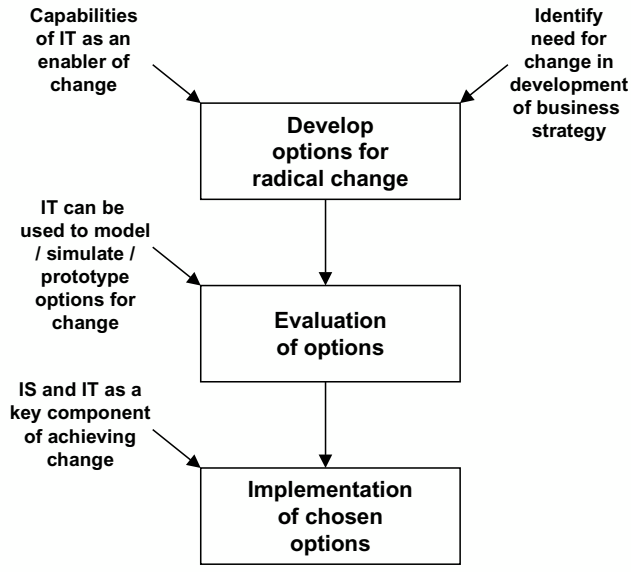

Figure 4.1 *The role of IS/IT in business process re-engineering*

Table 4.1 *Reconciling IS/IT and BPR*

Questions	*Business process re-engineering*	*IS/IT strategy formulation and planning*
Formulation	1. How can we re-engineer our business to provide advantage?	1. How can IS/IT be exploited to provide business advantage? (impact)
Implementation	2. How can we improve our processes to ensure success of the strategy?	2. How can IS/IT ensure the success of the business strategy? (alignment)

weaknesses of the business and its IS/IT operations. This is vital, because the current situation represents the starting point from which any change programs begin.

Determining the IS/IT Requirements: The IS Demand

One way of determining the IS strategy is to ask each area of the business what their requirements are. This is likely to deliver a comprehensive

'wish list', but would result in no insight into the relevance, or genuine priorities, and little knowledge of the inherent IS/IT requirement in the strategy of the business.

Another way is for a group, charged with defining or updating the IS/IT strategy, to absorb every written strategy statement and interpret them into relevant IS/IT principles and critical success factors (CSFs), application requirements associated with major planned initiatives, and a set of supply criteria to deliver the service demanded by the business. This would be possible if the strategy were documented in sufficient detail and the business strategy documents contained comprehensive descriptions of the current and planned business activities and environments. Its main defect would be in the inability to feed into the development of the strategy and initiatives the opportunities for exploiting IS/IT to its fullest potential. In practice, this level of documentation rarely exists, unless it was built up in an earlier business or IS strategy cycle and has been updated to reflect the current situation and requirements.

Undoubtedly, the best course is for the IS strategy to be developed in parallel with the business strategy, feeding trends, opportunities and ideas into the business strategy process, and then working closely with all areas of the business in building up a set of achievable business and associated IS/IT initiatives that will deliver the targeted performance. The IT strategy—supply—can follow directly from this analysis.

To achieve the desired results, it is necessary to obtain a complete understanding of the drivers for change and the current situation ('where we are') and then to articulate the situation being sought ('where we want to be') and start to propose how the gaps might be closed ('how to get there'). This will include both business and IS/IT initiatives. These are identified through a mixture of fact finding and analysis focused on the elements of the business and technical environments. This is illustrated in Figure 4.2. Table 4.2 contains an extensive list of fact-finding and analysis tasks that could be undertaken, and the purpose or deliverables associated with each of these.

Gathering the Relevant Data

The quality and value of any IS/IT strategy that is ultimately developed is dependent upon the depth of understanding of the business and its needs, and the constructive interpretation of these needs into appropriate information, systems and IT services. To this end, if the information is not readily available and accessible to address the areas in Table 4.2, some or all the tasks in this table should be undertaken. Whatever techniques and approaches are used, the results are more useful if they are recorded in a

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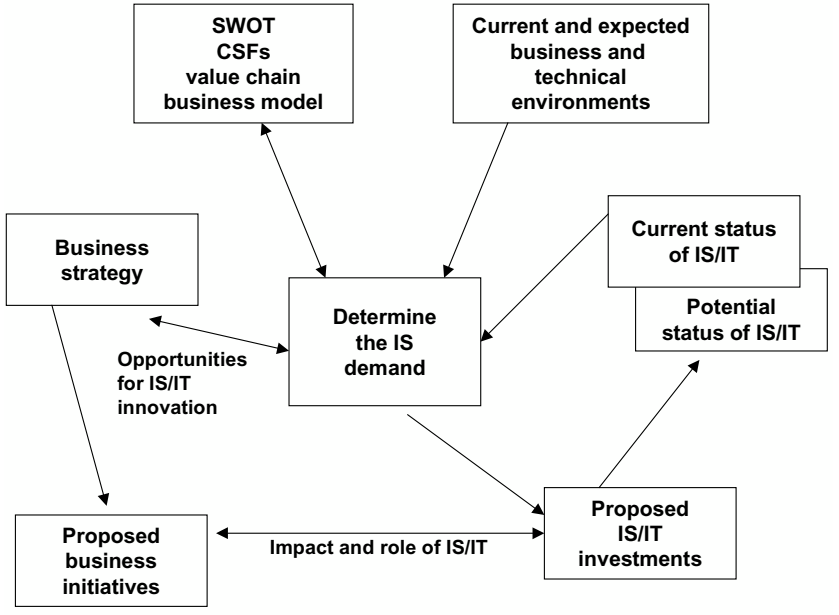

Figure 4.2 *Determine the IS demand*

manner that facilitates analysis. The approach described here relies on constructing a clear, structured set of information, and, where appropriate, constructing models showing the organizational, business and information requirements. A potentially significant problem with IS strategy development is of being engulfed by a surfeit of data. What is required is sufficient understanding of the business and information environments to be able to develop sensible and realistic strategies—but not the type of exhaustive analysis associated with detailed design and development of systems.

Much of the key information required is often in the heads of employees at all levels in the organization and needs to be elicited through discussion. However, discussions and workshops will be wasted effort and frustrating for business people if used to establish facts that can be obtained from available documentation. Not only does it waste time but it also means that important opinions expressed will not be seen in a factual context. Such problems can be avoided by reviewing as much available documentation as can be found ahead of any discussions. These may include business strategy documents, or at least formal statements of objectives and key performance indicators (KPIs). Other useful documents are likely to include annual plans, budgets and forecasts.

Table 4.2 *Fact finding and analysis tasks and deliverables*

Task	*Purpose or deliverable*
Analysis of the business strategy	Identify its components and the associated information needs derived from it
Analysis of the current and expected future external business environment, and analysis of the current and future portfolio of the business, and its competitive strategy	Determine how IS/IT can contribute to strengthening the business's competitive positioning
Analysis of the internal business environment	Understand the relevant organizational characteristics, SWOTs and other factors
Identification of the critical success factors of the business. These are frequently the drivers for change	Crystallize the essential characteristics of success in meeting the objectives stated in the strategy
Information analysis	Model the logical activities and inherent information elements of the business
Evaluation of the effectiveness of the current processes	Identify where changes need to occur, and how IS/IT can improve the performance of the processes
Identification and analysis of the internal and external value chain	Identify the most important information flows through the business and across its value chain partners
Further value chain analysis	Bring into focus potential opportunities for improving the value delivered by information, or identify potential hazards, where success may be jeopardized by poor interfaces
Creation of a conceptual architecture showing how the enterprise's information and processes might be restructured	Ensure maximum contribution to performance targets. Modelling future processes is a key element in business process redesign if it is being undertaken as part of re-engineering the business
Compilation of a catalogue of all the hardware and software being used by the organization, and the principal functions performed by each of the systems	An input into migration planning
Evaluation of the current application portfolio	Determine the inventory of information systems in use and in development, and assess their contribution and potential
Evaluation of current IS/IT policies, organization, processes, services, capabilities, etc.	Assess their applicability to meet current and future business needs

INTERPRETING THE BUSINESS STRATEGY

A framework for developing an IS/IT strategy was described in Chapter 3 and illustrated in Figure 3.8. Two of the inputs relate to the business perspective—internal and external. The elements of both these perspectives should be identified and analysed, so that the demands they place on IS can be derived and that ways of exploiting opportunities or countering the threats they contain can be determined. The majority of information needs are internal, generated in the operational activities, in pursuit of ever-improving performance and the measures that are needed to monitor it, and in the communications passing between activities. Others relate to external factors and are of particular significance in areas concerned with customer and supplier relationships and competitive activity.

Internal Business Environment

The elements of the internal environment that need to be identified, analysed and understood are:

- the business strategy, not just the objectives but the intended means of achieving them;
- the current business processes, activities and the main information entities (e.g. customer, stock item, account) and how they relate to other entities;
- the organizational environment, covering its structure, assets and skills, and the less tangible factors such as knowledge, competencies, values, style, culture and relationships.

From these, the information, systems and technology needs arising from the business strategy and the current activities of the business can be assessed and prioritized. This can be illustrated by considering two types of activity driven by the business strategy, and how they determine information needs:

- Activities that must be performed in order to contribute directly to the achievement of the business objectives, and their supporting information needs, have to be identified. For example, the business objectives may include ones to increase market share and improve customer satisfaction. One of the initiatives proposed to achieve this may be to launch a new product or service. Associated information

requirements include market size, competitor products and services, and customer requirements.
- Secondary activities that have to be performed in order to measure performance toward achieving those objectives must be identified. For example, once a new product has been launched, it is necessary to monitor the take-up of the product or service to see if additional funding is required for advertising and to plan the resourcing levels required to sustain the sale of the product in its particular market and meet customer demand.

The Business Strategy

In analysing the business strategy, the main requirements are:

- To identify the current strategy and, in particular, any emergent new elements since the previous strategy development cycle.
- If necessary, to interpret and analyse the strategy, and describe it in a structured manner. This is best tackled by a mixed group with both business and IS disciplines and skills represented.
- To compile and confirm the consequent IS requirements.

The business strategy may exist in a variety of forms: as formally recorded corporate, business unit or functional area strategy documents or less formally in other documents and/or in the heads of individuals. In the latter case, it can usually be understood and confirmed through discussions with senior management. The main constituents are defined and described in Box 4.1.

The best context for IS strategy development and implementation is:

- Deriving the IS strategy alongside all other component strategies such as marketing or product development, or within a business re-engineering program or redesign of business processes.
- Implementing a program of initiatives to deliver the business strategy that includes the critical IS/IT developments alongside and within other business initiatives. Business re-engineering is again a good example.

However, in many instances, business strategies and objectives are not recorded formally, are not well constructed or not well communicated. Then, they can only be identified through questioning, analysis and creative prompting. In such cases, it may be necessary to work back from current actions and derive an implied business strategy. Indeed,

Box 4.1 Core constituents of a business strategy

Mission
An unambiguous statement of what the organization does and its long-term, overall purpose. Its primary role is to set a direction for everyone to follow. It may be short, succinct and inspirational, or contain broad philosophical statements that tie an organization to certain activities and to economic, social, ethical or political ends. Often called 'strategic intent'. Values are also frequently stated alongside the mission. Three widely-differing examples of missions are:

- 'To be the world's mobile communications leader, enriching the lives of individuals and business customers in the networked society' (large global telecommunication company).
- 'To eradicate all communicable diseases worldwide' (World Health Organization).
- 'The company engages in the retail marketing on a national basis of petroleum products and the equitable distribution of the fruits of continuously increasing productivity of management, capital and labour amongst stock holders, employees and the public' (a large public company).

Vision
Increasingly found in business strategy deliverables, this gives a picture frequently covering many aspects that everyone can identify with, of what the business will be in the future and how it will operate. It exists to bring the strategy to life and to give the whole organization a destination that it can visualize, so that every stakeholder has a shared picture of the future aim.

Business Drivers
These are a set of critical forces for change that the business must respond to. They may represent short, medium and long-term factors on which the business must focus in order to meet the objectives and satisfy the CSFs. They are frequently weighted and can be used in prioritizing improvement proposals. For example, the main short-term driver may be reduction of the cost base, the main medium-term driver may be increased market share and the main long-term driver may be zero-defect quality.

Objectives
The targets that the organization is setting to take it toward achieving its vision. They are usually small in number, but embody the most important aspects of the vision such as financial returns, customer service, manufacturing excellence, staff morale, social and environmental obligations. They are statements of future results or steady states that an organization wishes to achieve at its global or strategic business unit level. They are normally quantified with associated values and deadlines. Ideally, they should display the following characteristics:

- unambiguous and results orientated;
- measurable, verifiable and not too numerous;
- established by those involved in their achievement;
- relevant, achievable and encouraging high performance;
- consistent with any higher-level objectives.

Examples are:
- 'Reduce manufacturing costs by 10% each year for the next five years'
- 'Achieve zero overdue orders within 12 months'
- 'Reduce staff turnover to less than 15% per annum within 2 years'
- 'To lead in each local market by customer and brand loyalty, lowest-cost position, share of profit pool and employee satisfaction'

Usually, the mission and the organization's strategic objectives are cascaded down through the business, and each business function or core process is given the opportunity to develop its own objectives in response to the high-level ones. They are frequently tactical in nature and give rise to short-term IS requirements.

Strategies
They define the way in which objectives will be met. They may reinforce existing policies (e.g. the steering committee structure for approving capital expenditure) or initiatives that will continue to be pursued, perhaps with expanded resources (like a customer care programme). They may also state a new set of policies and new initiatives that will be put into practice like the redesign of the production processes of the business.

Frequently, they do not exist, and one of the ways in which the IS

strategic process can help is in facilitating the identification and documentation of candidate schemes for achieving the objectives.

Critical Success Factors (CSFs)
CSFs are the few key areas where 'things must go right' for the business to flourish. It is very important to identify them when aiming to obtain a profound understanding of the business. The very act of determining CSFs may help to crystallize objectives and strategies, and certainly to emphasize priority activities. CSF analysis is considered in more depth later in this chapter.

Business Area Plans
They are the plans of the various areas of the business, which document their response to the business strategy. In many cases, this may reflect a continuance of business as usual, with a focus on the key targets being introduced or reaffirmed. Though not part of the strategy, they contain pointers to information needs and need to be investigated.

the main achievement of the IS strategy process may be to focus attention (subtly, if necessary!) on the inadequacies and, at best, assist in formulating a business strategy that considers technological opportunities as significant elements.

There may be no business strategy at all and objectives that only point at the 'bottom line'. In this case, probably the best that can be achieved is to analyse and record current activities, tactics and operational needs, from a top-down viewpoint. Analysis of the business and of its critical components will provide invaluable input into any future formulation of business strategy. In the interim, short-term IS planning can focus on supporting current high-priority business needs and on identifying and alleviating critical problems that threaten the business with competitive disadvantage. The main techniques, in this case, revolve around undertaking a detailed analysis of implications of current critical success (or failure) factors (CSFs, CFFs).

Information needs may arise from all the elements in the business strategy and they are a significant source of requirements in the compilation of the IS strategy. For example:

- The mission, vision, strategic and tactical objectives and key performance indicators set the targets for defining or assessing current

initiatives; the external business drivers supply the basis for new or potential initiatives.

- The strategies or initiatives, if they have been articulated, are increasingly likely to have an IS/IT content that is often essential to achieving the desired result. These usually represent medium-term requirements that may be application-specific or may point to required improvements in IT services and the infrastructure. Longer-term requirements emerge, once IS/IT opportunities are identified, for impacting the business and its competitive strategy through innovative application of IS/IT.
- The business area plans usually have short-term IS/IT requirements, often carried forward from earlier cycles, but perhaps with different priorities, based on the current objectives.
- The CSFs (often used in conjunction with a 'Balanced Scorecard'—see later in this chapter) lead to two different types of IS/IT requirements: those that will enable success and those that monitor progress.

Business Processes, Activities and Key Entities

Another set of deliverables, derived from analysis of the current situation, are models that depict the processes, activities and main information elements, and how they relate to one another. These models make up the business model and, together with supporting IS models, comprise an IS architecture for the business (see Figure 4.3). These models offer a number of benefits. They provide:

- A valuable aid to understanding what is happening in the organization and for clearly visualizing the business processes and information flows, independent of organizational structures.
- A communications vehicle for explaining and illustrating them to a business audience in a manner that is easy to comprehend.
- A means of reviewing the merits or otherwise of the organizational structure, when viewed against the business model. This is a very valuable feature, especially when evolutionary development has created anomalies in the structure of the business, as, for example, when a particular executive has 'carried' a part of the organization with him when he moved to a different area of the business or assumed another responsibility.
- A basis for highlighting particular messages. These might be:
  - the disjointed nature of the processes, which inhibits effective operations and interrupts information flows;

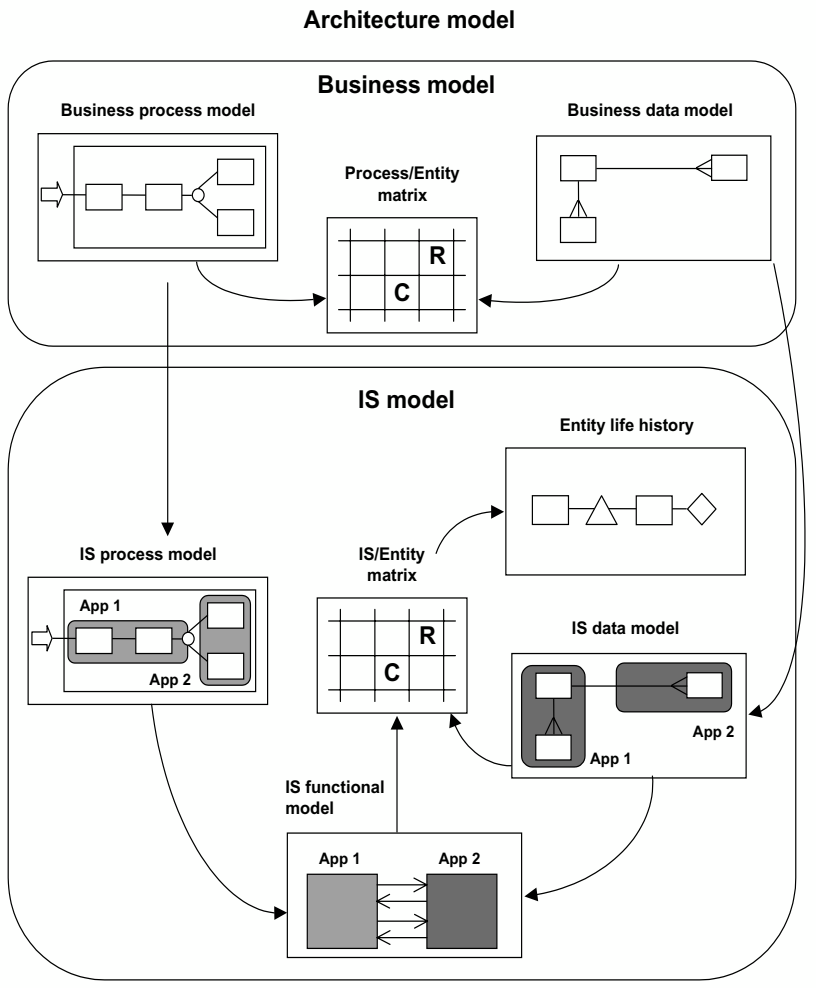

Figure 4.3 *An example of an architecture model, comprising a business and an IS model (*source: *M. Cook, 'Architecture models', working papers, Glaxo Wellcome Operations, 1995)*

  - where CSFs are focused;
  - high-cost and other problem areas;

- A basis for conceptually defining activities and for designing and illustrating improvement opportunities.
- A basis for indicating the scope of application areas and for defining the future systems architecture.

- A mechanism for mapping current applications against the processes they support.
- A basis for explaining the importance of having a common set of terms in a business. It is quite common for organizations to have different understandings of a particular term used within the same organization. For example, one particular managing director commented that, at a board meeting, he had four different parts of the organization giving him four different answers to a question about sales. The production department said that they had produced for sale a certain quantity of goods, and that was their 'sales figure'. The marketing department had another set of figures for 'sales', which was independently derived from their forward-marketing projections. The sales department had a figure based on customer orders, while the finance department had a figure based on actual invoiced sales. Each of those directors was talking about what he thought was the same information, but clearly there were four entirely different sets of figures involved.
- A means of identifying high-level redundancies. As an example, an analysis was conducted at a financial institution using the techniques of data-flow diagramming and entity modelling. One particular area of the organization was reviewed, and it was found that, while considerable activity was taking place within the department and information was coming into it, nothing, in fact, was leaving it! This had arisen because, some years before, exchange controls had been introduced by the government of the country concerned and this department was then established to monitor exchange control. However, when the exchange controls were relaxed the department carried on, but there was then no purpose to it!

An example of a business model and its associated IS model is given in Figure 4.3. The IS model indicates applications and their relationships. The individual models are created to depict:

- *Business processes*—the sets of interlinked activities or roles that deliver specific outputs to identified customers inside or outside the organization. In many cases, a functional organization inhibits the effective operation of the business processes, by placing barriers at the functional boundaries, and, in effect, preventing the timely and smooth flow of information. Nevertheless, the underlying processes may be identified and modelled. Value chain analysis, a technique covered extensively in Chapter 5, is invaluable in identifying and confirming the key processes in the business, and across its external boundaries. It ensures that the process ends at a point when a

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satisfactory business outcome is delivered (i.e. when value has been delivered to the next partner in the chain). Later in this chapter, we consider how business processes are analysed.

- *Activities*—the elements of the business processes that the organization undertakes to produce, promote and distribute its products or services, to develop, support and administer its infrastructure, and to measure performance against objectives.
- *Key entities*—within an activity, those 'things' that are of fundamental importance to the business processes, and for which there will be associated information, although not necessarily held as computer information. They may include people (customers, suppliers, employees), objects (products, invoices), places (workshop, laboratory) or abstractions such as events (sale, order). The models also indicate relationships between the entities (optional or mandatory, one-to-one, etc.).

These models are obtained from top-down analysis of the business. They are all high level and tend to be somewhat imprecise, since so much of the detail is absent, but are capable of successive decomposition so that they can become increasingly more precise, when later undertaking feasibility studies and systems development activities. They are frequently called 'fuzzy' models at the high level. The entities themselves are likely to become the focus of the subject databases subsequently developed and maintained. The IS models are likely to include:

- *Process flow models* or *process dependency charts*, which show the end-to-end series of information dependencies and actions that deliver satisfactory business outcomes to external or internal customers. An example might be 'develop a new product'.
- *Hierarchical activity models* or *functional decomposition diagrams*, describing the business units' activities. They are produced by activity analysis and show how the high-level functions of the business are broken down into broad activity categories defining what it does or wants to do (sell and produce products, etc.) and then into more detailed subordinate activities.
- *Entity relationship models*, showing the relationships of the key entities or entity groups relevant to the organization. Their main purpose is to define the underlying information architecture, independent of any functional considerations. They also provide a means of clarifying company-wide business language and are the source of the initial entries into the business unit's data dictionary.
- *Data flow diagrams* (DFDs), indicating the movement of information around, into and out of the business. A DFD is a network

representation of business information systems and shows the logical dependency of one activity upon another for its data. The most significant characteristics of DFDs are that the situation is represented from the viewpoint of data, not a person or organization. The diagrams are graphic and can be partitioned and layered so that rather complex flows can be easily shown. They can be structured so that functions can be decomposed into more detailed self-contained models.

- *Activity/Entity matrices*, providing a tabular representation of the business and illustrating the relationship between information entities, conceptual business activities and conceptual application areas. They plot the usage of information entities against the business activities and also record whether the particular activities create, use or modify the entities. This enables a first-pass attempt at matching application areas to important business needs and showing how information will be shared across applications.

More details regarding IS modelling tools can be found in Avison and Fitzgerald,[9] Avison and Wood-Harper,[10] and Checkland.[11]

The creation of models, and the accompanying fact finding and analysis, is frequently performed within the IS strategy development process by information analysts in the team, working with people from the business side to obtain the relevant information. They are often initiated at workshop sessions with business people, held to discuss the business strategy and IS requirements. Alternatively, the models may have been built by the IS function independently of the IS/IT strategy development process, or they could be built as part of a business re-engineering initiative. If the models already exist, they may just need verifying and updating. Many of the large enterprise systems vendors also supply generic industry process models. Some modelling tools such as ARIS[12] also have a library of models for different industries.

Once process models have been developed, the processes can be evaluated for their effectiveness in meeting business needs. An approach for assessing the effectiveness of processes is presented later in the chapter.

Information models may be created for the whole corporate body or at strategic business unit (SBU) level or even major business function level. In the latter case, there may need to be a rationalization process to identify common entities, cross-functional entity relationships and common logical activities. Policy and implementation issues relating to rationalization would then follow in the management of corporate information and development of application systems. There may also be organizational implications if there is merit in rationalizing operational activities.

In a large organization with several business units, it is most probable that separate models will be created for each unit, but that there will be no attempt to create a global model for the whole organization. However, where there is a good deal of similarity between the units, or business synergy, then reconciliation between common entities becomes important, when the business relationships are explored. Similarly, when consolidation of information from various units up to corporate level is considered, reconciliation may also be desirable.

Organizational Environment

When considering the process and information needs of an organization, it is also essential to have a clear understanding of the organization's current structure, relationships and the people of which it is composed. These organizational dynamics form an important input into the planning process. It is necessary to understand the environment and its skills, resources, values, culture and social interactions, as well as its management style and its relationship with the external environment. These become increasingly important when the magnitude and pace of change has implications for all aspects of a business. There are a number of organizational development and organizational modelling techniques that can be used to prompt the analysis, one of which is covered later in the chapter.

External Business Environment

This external environment was described in Chapter 2. For the purposes of IS strategy formulation, it is essential to understand and analyse the environment, so that opportunities for IS/IT to impact the business and contributing to the shaping of the business strategy can be identified and explored. The analysis of the external environment and the development of IS/IT initiatives to exploit its opportunities and counter its threats is further covered in Chapter 5.

EXAMINING THE CURRENT IS/IT ENVIRONMENT

In order to assess and prioritize IS actions, it is also necessary to examine the current IS/IT environment to establish the gap between current and future targeted provisions, so as to determine whether the environment can sustain the changes required or itself needs changing. Gaps may

relate to the provision of the target portfolio, either by enhancement of existing applications or by developing new ones. The remainder may affect any of the other aspects in the IS/IT environment, including the organization, its competencies, the technical infrastructure or supplier relationships.

While most of the analysis of the current IS/IT environment relates to factual matters, a further important aspect is to ascertain a business manager's perception of the role and current effectiveness of IS/IT. This will enable IS/IT management to determine whether they have to address issues creating the perceptions held and will also give a good indication as to the level of commitment the business is likely to give to any proposals. Chapter 8 addresses issues regarding the relationship between the IS function and the business.

Examination of the external IT environment enables the strategists to take account of trends and opportunities from emerging technologies and to investigate how competitive or complementary organizations are applying IT. This will lead to a more objective appraisal of current effectiveness, as well as to new ideas for potential application of IT.

Assessment of the *internal IS/IT environment* comprises:

- an evaluation of the current application portfolio and the applications under development to determine their content, coverage and contribution;
- a similar evaluation of current information resources;
- an evaluation of the current infrastructure and IT services and resources, accomplished through a technology assessment.

The results are the basis of the assessment of the gap between current and required provisions. While this work can be conducted independently from the analysis of the business environment, there are obvious advantages in maintaining frequent contact between the two activities to ensure that the assessment of IS/IT is conducted in the context of what the business wants to achieve. The most significant aspect is the current application portfolio, since it represents the starting point from which future development will begin. It is also a key determinant of how the business community in the organization perceives the value and contribution of IS/IT.

Current Portfolio Evaluation

The current suite of applications includes centralized, distributed, web-enabled and end-user systems and databases that support various aspects of the business—administrative, operational, control, planning and strat-

Table 4.3 *Deliverables from a current portfolio assessment*

- Categorization in terms of application portfolio segments—strategic, high potential, key operational and support
- Assessment of coverage and contribution of systems to business needs, and any major opportunities to increase business value
- The extent to which the systems integrate or interoperate
- Assessment of the effectiveness and robustness, and the unrealized potential in current systems, and of the enhancement required to increase contribution
- Common elements and differences between current portfolio and required information and systems architecture
- Supporting information to enable estimates of potential improvement projects
- Supporting information to allow prioritization of enhancement and support work on current systems
- Opportunities that exist to improve quality of information
- Strengths and weaknesses assessed against the business CSFs
- Assessment of the risks of failure from the current portfolio

egic. Gaining a thorough and agreed understanding of the portfolio enables measurement of its value to the business and the contribution that systems make towards satisfying business objectives. This will include a description of the functions performed by each of the systems and an assessment of their technical and functional effectiveness, as well as the opinion of the users in terms of utility and value to them. The analysis includes not only existing systems and databases but also those under development and those planned but not yet under way. Clearly, any of these could be revised as a result of the strategy process.

Typical deliverables from a systematic assessment are listed in Table 4.3. The likelihood is that key operational and support quadrants will be well populated, and that a few systems will indicate some strategic use of IT. Often, there are a number of high-potential systems created by end-users experimenting independently with innovative ideas.

The analysis involves gathering and collating a substantial amount of factual and subjective information, both technical and user orientated, for each system from two main sources:

- The users of the information systems and databases—to gain information about how the system supports business objectives and processes; the functionality and business information in its scope; users' views on system quality and the usability of the application; dependence on the application; documentation, training and systems support quality; users' views on its future potential.

Table 4.4 *Sample questions for evaluating the current portfolio (*source: *adapted from a questionnaire developed by T. Osborne, 'Current portfolio questionnaire', working papers, Glaxo Wellcome Operations, 1994)*

1. What business activities are 'contained' within the system?
2. What information (automated and manual) flows through the system and how is the information accessed and transferred?
3. Does the system support a critical business process, with reference to objectives, critical success factors, drivers, value chain? Does the system inhibit the effectiveness of the core process?
4. How does the system map on to process maps, entity charts and the conceptual architecture? How does it map on to the future applications architecture, if one has been developed?
5. What problems—gaps, poor links, duplications, etc.—are revealed?
6. How does the system contribute to meeting the IS demand determined in business strategy analysis?
7. How effective is user support in terms of responding to and clearing up problems, and how effective is training, documentation and usability?
8. How useful, accurate and timely is the information put into and taken out of the system?
9. Are there any better ways of using the system?
10. How flexible is the system for making changes?

- The IT development and technical staff—to gain information about the structure and interfaces of information systems and databases: their technical characteristics, quality, age and technical robustness, ease of maintenance and extent of data duplication.

This part of the strategy process can be very extensive and time consuming, and care must be taken not to spend too much effort here, which may not be repaid. A relatively short evaluation may be quite adequate to obtain a broad picture, then, later, when the intended initiatives are becoming clearer, further investigation can be made of targeted areas of the portfolio.

The information may be collected by discussion or questionnaire, or by a mixture of both. A questionnaire may be the only practical method, because there are often multiple users for major business systems and databases. A selection of the type of questions that might be asked is given in Table 4.4.

Current/Previous Strategy and Policies

If IS/IT strategic formulation and planning is a continuous process, it is very likely that a previous IS/IT strategy exists, which documents the

previous 'current situation', the policies that were to be adopted and plans for accomplishing the changes. This would have included the investment in capital expected and the expenditure expected in relation to turnover or organizational budget. It would also have documented pertinent policies (e.g. information management policies or policies governing the selection of technology products, services and vendors). Careful scrutiny of the previous strategy and its business rationale will guard against making critical policy decisions that may be difficult, if not impossible, to implement. Chapters 8–11 address many of the factors in the IS/IT environment, which are briefly described in the following subsections.

IS Organization and Processes

This covers a number of aspects that will be more or less relevant, according to how effective the current services are and whether the role of IS/IT in the organization needs to change drastically. It is likely that the following factors will need assessing for their suitability:

- the IS function, its size, structure and relationship with the business at organizational, functional, departmental and individual levels;
- the organization for the provision of IT resources and services;
- sourcing strategy for IT resources and services;
- how the IS function is managed and the level at which it reports into the corporate level and individual businesses;
- the IS/IT governance structure, including decision-making processes and any steering committee structure in place;
- how business cases and budgets for IS/IT investments and expenditure are prepared and by whom, and how they are authorized.

These topics are covered in detail in Chapter 8.

Current Assets, Resources and Skills

These are the assets of the organization in terms of hardware, software, communications capability and any other technology employed, together with the information resources, human assets and skills of IS/IT people and users. This inventory must be reviewed for its relevance and ability in meeting future requirements.

Methods and Training Provisions

This refers to the methods in use for business and systems analysis, business process re-engineering, systems design and development, data

management, project management and control, quality assurance and control, and estimating. It includes any systems development methodologies, object-oriented methods, technical standards, use of rapid application development (RAD) methods, decision support, expert systems or any other specialized tools. It also covers training and education methods employed, and any particular awareness programs directed at the business to raise understanding of IS/IT. Similarly, any awareness or other training available for technical people on business matters is also covered.

Much of the assessment of the IS function and its processes can be accomplished by focusing the organization modelling technique, described later in the chapter, on the IS function itself. This provides a framework of questions and a structure for assessing the answers.

What Does the Business Think of IS?

It is advantageous to have an objective view of the current role and contribution of IS/IT in the business, the role and contribution of the IS function itself, and of the perception of this from the rest of the business. This is not an exact science, but an objective and largely qualitative perspective can be drawn by considering a number of different aspects:

- Analysis of the current application portfolio can provide a great deal of information. By categorizing the portfolio into strategic, high potential, key operational or support systems, it can indicate how well current and future business strategy is supported. This is also a key indicator in assessing how IS/IT is perceived by business people. If, for example, there are no strategic or high-potential applications, this suggests that management consider IS/IT of little strategic value to the business. Chapter 7 describes in detail how to assess the applications and the resulting management options and issues.
- Consideration of how many of the business functions and processes are underpinned by systems, and of the size of the applications development backlog, gives an indication of the level of support given to the operational and management needs of the enterprise.
- Assessment of levels of user satisfaction across the range of IS/IT services gives a preliminary view of the effectiveness of the relationship achieved between IS/IT and the business. User roles in managing projects and in developing business cases, together with the IS function, gives a measure of the cooperation existing between the business and IS function.

- The level of integration achieved between systems and across different technologies, and the status of information management in the business, gives a good measure of the degree to which information is considered a key corporate resource.
- Analysis of the role and the structure of the IS function, in relation to the structure of the organization, indicates whether IS/IT is already well integrated with the business.
- An indicator of the current role and value of IS/IT comes from the level in the management hierarchy where overall responsibility for IS/IT resides. This is increasingly a board-level appointment in businesses where IS/IT is considered strategic.

Peppard and Ward's[13] research has indicated that, where IS function is perceived as making a value-added contribution to the business and where there is a close relationship between the IS function and the rest of the business, IS/IT has a significant positive impact on business performance. If the relationship is poor, the organization is probably faced with a long struggle, first of all, to, improve the perception of IS/IT and, second, to get business managers involved in IS/IT decision making. Implementing an IS/IT strategy process, as outlined in this book, will be challenging, particularly when exploring the impact of IS/IT and seeking opportunities for innovative application (as opposed to alignment). In Chapter 8, the relationship between the IS function and other areas of the business is explored in more detail.

External IS/IT Environment

This final input into the strategy process relates to the external IS/IT environment, where the purpose is to gain a perspective on technology trends and opportunities for using IS/IT in new and innovative ways. It does not necessarily mean seeking ideas for implementing leading-edge technology, although these are not precluded. The aim may be to find ways of using existing technology at lower cost or in previously unconsidered ways.

Part of this involves looking at what competitors or other comparable organizations are doing. This outward view is useful not only to pick up ideas but also to obtain a measure of the relative maturity of the business's own IS/IT contribution. It may be a deliberate policy of the company not to be a pioneer of any new technology in its own business sector or a leader in innovative use of IT at all, but to follow at a measured pace behind the recognized leaders.

Another aspect of this external survey may be to categorize elements of technology that may be worth evaluating in more detail later, when implementation issues are addressed. Clearly, any organization that makes a point of following external trends and opportunities through an established mechanism will have the required information available as input to the planning process.

IT research establishments such as Gartner, IDC and Forrester Research can be another good source of technology trends and information. However, organizations should exercise caution when reading many of their reports, particularly regarding vendors, as they may not be as independent in their assessment as it might seem. Not only do many of the research organizations charge for providing information but they also charge vendors a fee; failing to pay usually means a vendor is not included in any of their assessments or analysis despite the fact that they may be providing a superior solution.

TECHNIQUES FOR INTERPRETATION AND ANALYSIS

There are many techniques that can be used in analysing the current situation and business strategy. Some of them are included in Table 4.5, which also indicates the main deliverables derived from the techniques. Those marked with a single asterisk have already been described or will be described in this chapter; those marked with two asterisks are essentially 'impact'-seeking techniques and are described and their use explained in Chapter 5. The remainder includes standard techniques such as SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis and business strategy analysis. Business process redesign is also referenced and, although it is described in overview several times in this book, as already noted it is too large a topic to cover in detail here.[14]

The aim of the rest of this chapter is to briefly describe these techniques and to suggest why and how they are used.

INFORMATION REQUIREMENTS TO MEET THE CURRENT BUSINESS OBJECTIVES: THE USE OF CRITICAL SUCCESS FACTORS AND BALANCED SCORECARDS

In order to position critical success factor (CSF) analysis and the Balanced Scorecard, it is useful to develop the link between data, information and business results. Figure 4.4 illustrates such a model, the DIKAR model (Data, Information, Knowledge, Action, Results), derived from the work of Venkatraman.[15] Viewing the model from left

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Table 4.5 *Techniques used in creating the IS demand statement*

Technique	*Deliverables*
Business strategy analysis	Business strategy—mission, objectives, etc. Global business initiatives Business area initiatives Business priorities IS requirements leading to IS demand
Critical Success Factor (CSF) analysis*	Areas of business activity 'where things must go right' Potential IS/IT thrusts Performance measures
SWOT analysis	Analysis of Strengths, Weaknesses, Opportunities and Threats of internal and external business and IS/IT environments
Balanced Scorecard analysis*	Business objectives and key information requirements Performance measures
Business portfolio and competitive strategy analysis**	Options for long term IS investment to strengthen competitive position
Value chain analysis (internal and external)**	Internal information flows High-level 'industry' information flow model Potential impact of IS/IT
Process analysis*/Business process re-engineering*	Identification of core business processes Effectiveness of processes in meeting drivers Process improvement options Process redesign blueprints (that deliver significant performance improvement regarding drivers) Resultant IS/IT options
Organizational modelling*	Comprehensive assessment of the business and IS/IT environments Filtering mechanism in assessing options for change
Business modelling—information analysis techniques*	Enterprise model: —entity models —object models —process dependency charts —data flow diagrams —functional decomposition diagrams —conceptual architecture

continued

Table 4.5 *(Continued)*

Technique	*Deliverables*
Current portfolio evaluation*	Profile of current applications Coverage and contribution to business user and technical satisfaction Contribution of applications to business strategy
Technology assessment and IS/IT infrastructure review	Inventory of current hardware and software Assessment of IS organization, procedures, skills and methods

* Covered in this chapter
** Covered in the next chapter

to right represents an IT perspective where the focus is on data processing and the provision of information to the business. Viewing it from right to left, the focus is on business results and the actions and knowledge required to achieve those results. (This model is used again in Chapter 10 when the concept of knowledge and its management is explored in detail.)

The Balanced Scorecard identifies the information required to measure performance against the business objectives. CSF analysis, on the other hand, identifies what has to be done, or changed, in order to achieve the objectives, including new information and/or systems needed. In combination, they provide a way of obtaining agreement as to the priority of IS investments relevant to achieving the explicit business objectives for the next 6–12 months.

Balanced Scorecard

The Balanced Scorecard has become a popular tool for managing the performance of organizations and, laterally, for the development of strategy itself. Developed by Harvard Business School academics Kaplan and Norton,[16] it is based on the premise that financial measures only report the results of past decisions and that, if performance measurement is to have any real meaningful impact, a more balanced set of objectives and measures is required. The Balanced Scorecard promotes the examination of performance from four interrelated perspectives, each seeking to address specific questions (see Figure 4.5):

- *Financial:* How do we look to our shareholders and those with a financial interest in the organization?

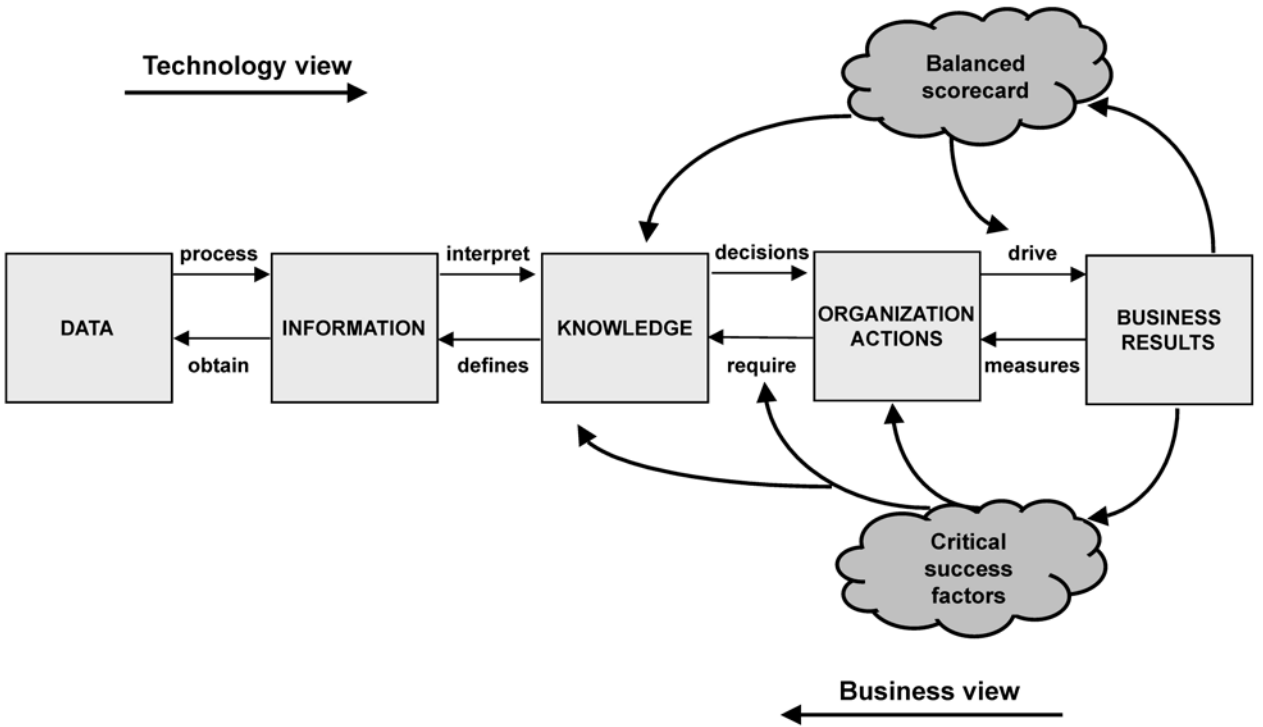

Figure 4.4 *Information in context* (source: *based on the work of N. Venkatraman presented at Cranfield School of Management, February 1996)*

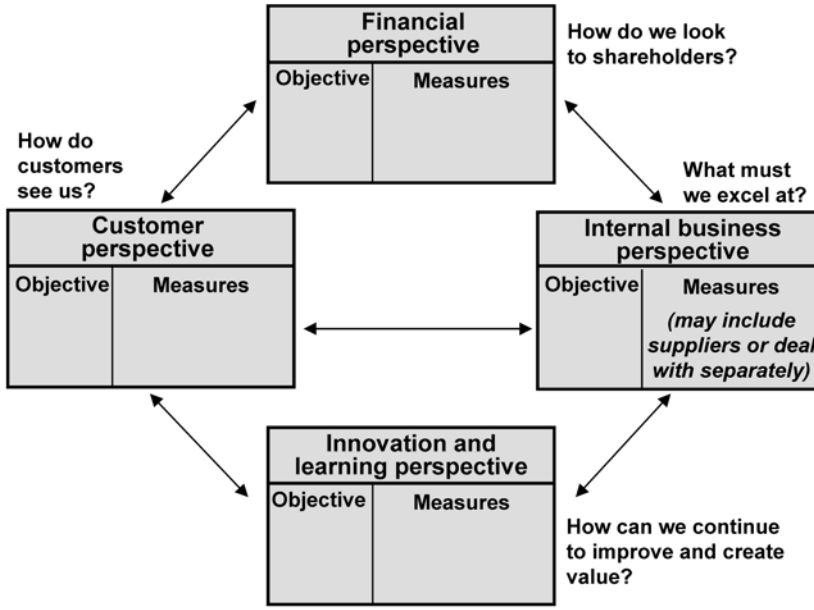

Figure 4.5 *Information and the Balanced Scorecard* (source: *R.S. Kaplan and D.P. Norton, 'Using the Balanced Scorecard as a strategic management system',* Harvard Business Review*, January–February 1996, 76. Used with permission)*

- *Internal business perspective:* What do we have to excel at if we are to meet the expectations of our employees and trading partners?
- *Customer perspective:* How do our customers perceive us in term of products, services, relationships and value-added?
- *Innovation and learning perspective:* To achieve our future vision, how will we continue to improve and create future value for our stakeholders?

For each of the four perspectives, objectives can be established and relevant measures, often called key performance indicators (KPIs), assigned against each objective, leading to the information needed to measure performance.

Critical Success Factor Analysis

CSF analysis is a powerful and deservedly popular technique not only in developing an IS/IT strategy but also for business strategy development.

Table 4.6 *Uses of critical success factor (CSF) analysis*

- It is a most effective technique in involving senior management in developing the IS strategy, because it is wholly rooted in business issues and in gaining their commitment to proposed IS actions that contribute to achievement in critical areas
- It enables linking of candidate IS projects through CSFs to objectives, and thus clearly demonstrates alignment with the business strategy, and provides a compelling basis for gaining wholesale agreement by the top-management team
- In individual interviews with senior management, it is a good catalyst in unearthing their own individual information needs
- By providing a link between objectives and information requirements, the CSFs play an important role in prioritizing potential investments
- It is particularly useful in IS planning when the business strategy has not progressed beyond objectives by focusing attention on the most critical aspects of the business that need action taken to improve their performance
- It is extremely powerful when used alongside value chain analysis in identifying the most critical processes, and enabling ownership of the CSF and its associated actions to be accurately pinpointed

The technique often appears under many guises (e.g. 'key issue analysis' and 'do wells') and is probably the most commonly used tool in the IS strategies toolkit. It can be used in a number of different ways and for different purposes, as indicated in Table 4.6. As described here, it is used for the purpose of interpreting the business objectives in terms of actions required to achieve them, the key information and application needs of the organization and its managers, and for assessing the strengths and weaknesses of existing systems, in that context.

The technique can be used at the macro-level to examine the overall industry (i.e. define industry CSFs), the company as a whole or a particular business unit. It can also be used at individual executive level to determine which of those activities that he or she performs are the most important for achievement of success against a particular objective. In this way, the CSF process can assist in prioritizing activities and information requirements, both at individual manager and at business unit levels. In both cases, the CSF technique helps to focus attention on the key issues.

What Are Critical Success Factors?

Rockart[17] defines CSFs as being 'the limited number of areas in which results, if they are satisfactory, will ensure successful competitive

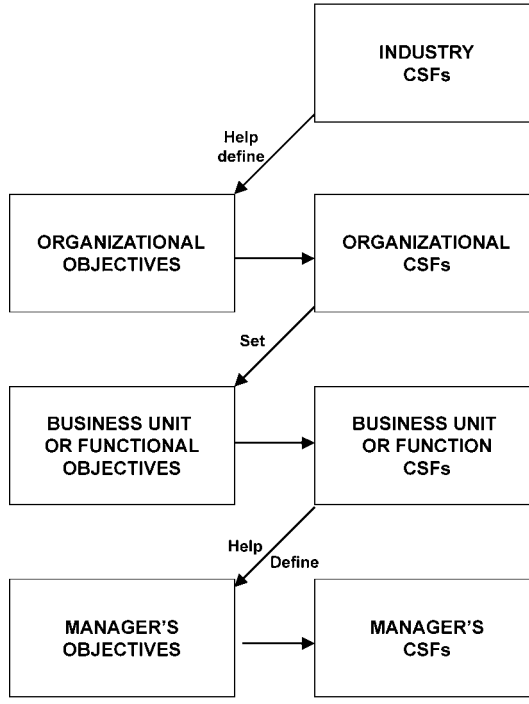

Figure 4.6 *Objectives and CSFs*

performance for the organization.' They are the few key areas where 'things must go right' for the business to flourish. As a result, the CSFs are areas of activity that should receive constant and careful attention from management. The current status of performance in each area should be continually measured, and that information should be made widely available.

Every firm in an industry may have some common CSFs such as access to raw materials or timely delivery, due to pressures on or in the industry. The overall organization, which could have units in many industries, will have CSFs relative to its objectives of diversification, return on investment and portfolio mix. The key area for determining CSFs as part of IS strategy development is the business unit, since—as stated in Chapter 3—this is the practical level to determine strategy. The agreement of the business unit managers as to what these CSFs are is important in obtaining consensus on the major IS/IT investments. There will also tend to be a structured, cascading relationship in a large organization between objectives and CSFs, as illustrated in Figure 4.6.

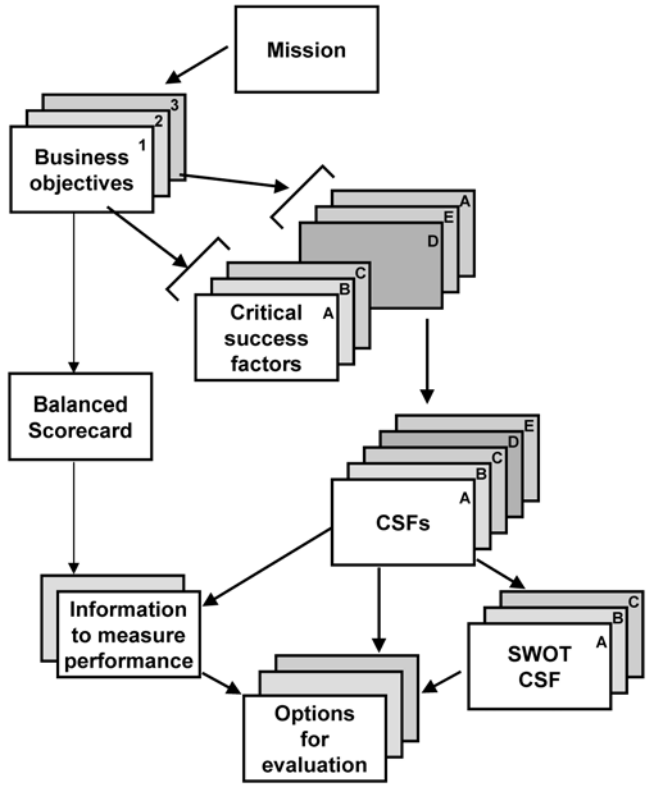

Figure 4.7 *Critical success factors basic processes*

The determination of CSFs should only be started when objectives have already been identified. The first stage is to identify CSFs against each objective, then, second, to consolidate them across objectives, since many CSFs will recur (see Figure 4.7). Ranking of objectives and the number sharing the same CSF will give a relative priority to the achievement of CSFs. Only then should the importance of information or systems in achieving those CSFs be considered. 'How can IS/IT help achieve the CSFs?' and 'How do existing systems inhibit achievement of CSFs?' are both important questions to consider, and this implies a SWOT analysis of existing systems against the CSFs. By implication, if the CSF is achieved, the probability of achieving objectives is increased. That assumes that there are a reasonable number of CSFs per objective—between five and eight per objective is a useful rule of thumb. Too many suggest that the objective is unachievable; too few and it is not ambitious enough!

From the above description, it may appear that the CSF is the universal management tool. This is not the case, for the following main reasons:

- To be of value, the CSF should be easily and directly related back to the objectives of the business unit. From experience in the technique, it generally loses its value when used below the third level in an organizational hierarchy.
- CSFs focus primarily on management control and tend to be internally focused and analytical, rather than creative.
- The nature of CSFs and KPIs reflect a particular executive's management style. The chief executive of one airline judged performance by load factors. His predecessor judged performance on the number of letters of complaint. Both are valid, but reflect different approaches.

When used effectively, it achieves a number of requirements, all of which are vitally important to the strategic process. They are:

- involving top management in the IS/IT strategy process and gaining their commitment;
- developing a consensus view of IS applications in the business;
- linking IS activity to business strategy;
- providing guidance for defining executive information needs.

When used ineptly, the approach can cause frustration, even despondency, and may even turn management against the strategy process. The most common cause of such problems is that 'critical' is not differentiated from 'important', resulting in long lists of factors that effectively describe everything the organization does! The strengths and weaknesses of the CSF approach are well documented. Shank *et al.*[18] list practical guidelines as to their use. They highlight the need:

- to use them in a formal, structured way;
- to educate people in advance regarding the process;
- not to link them solely and explicitly to the derivation of information needs.

In addition, the eliciting of CSFs works best (and is certainly done more quickly) in a group-working process rather than by conducting interviews with numerous individuals and then trying to collate the results. The value of a group approach is demonstrated by Hardaker and Ward[19] who report the use of CSF analysis as part of a concept called Process Quality Management in IBM. The CSF process must produce agreement

to move in a coherent direction, which is very difficult to achieve by later consolidation, rather than achieving consensus as the analysis proceeds. This also enables the CSFs to remain focused on the management 'business agenda' rather than the personal agenda of an individual and avoids ambiguity being left unchallenged.

It can be summarized by saying that the process is as important as the product, since it achieves commitment to the outcome. If well prepared for the process, senior managers find little difficulty in articulating CSFs, since they are often merely overt statements of issues that they are aware of or are already addressing anyway. Guidance in establishing an effective process, based on real organization use, is provided in the articles already mentioned in addition to Rockart and Crescenzi.[20] It is important to remember that consensus of the senior managers must be achieved in order to get eventual agreement on IS/IT strategies. It forces analysis of the strengths, weaknesses, opportunities and threats, and ensures a proper understanding of the mission and objectives, often for the first time!

Consolidating the Balanced Scorecard and CSF Analysis

The outputs from the construction of the Balanced Scorecard and the CSF analysis can be combined to provide a more comprehensive set of IS requirements. The Balanced Scorecard links measures to business objectives, while CSF analysis identifies what is critical to achieving results. Together, both techniques provide a rigorous assessment of prioritized IS opportunities, given the current business strategy.

Box 4.2 describes an example application of the combined use of Balanced Scorecard and CSF analysis. It illustrates how the combination can lead to the derivation of improvements to operational activities and the identification of both the internal and external information required by those operational activities, and for performance measurement in relation to business goals or objectives. It is always better to have a crude measure of something important rather than a refined measure of something that does not matter! CSFs help to differentiate the two.

BUSINESS PROCESS ANALYSIS

Business process analysis is a technique for assessing the effectiveness of core business processes in support of business objectives and drivers from one or a number of SBUs, or from specific business areas within an SBU.

Box 4.2 The application of Balanced Scorecard and CSF analysis

This example relates to a manufacturing company providing a product and parts service primarily to SMEs. This company produces a wide range of electrical products that are assembled mainly from imported components. Orders tend to be for unique products configured to customer specification. As far as possible, the company attempts to meet all customer orders direct from component stock. However, this has implications for stockholding costs, both of components and finished products. The time between order placement and fulfilment can be severely impacted by the availability of component parts.

Using the Balanced Scorecard, the company constructed a scorecard of objectives and associated measures for each of the four perspectives. A partial view of the scorecard is illustrated below. So, for example, from a customer perspective, one objective is to increase responsiveness for both firm orders and inquiries. Associated measures to indicate the extent to which this objective is being achieved include:

- order to delivery lead time;
- enquiry response times.

Objectives	Financial	Measures
- To reduce stock costs		(a) Stock turn (b) write-offs (c) Stockhandling costs
- To increase product profitability		(a) Product margins (b) Gross profit

Objectives	Customer	Measures
- To increase responsiveness		(a) Order to delivery lead time (b) Enquiry response time
- To be more price competitive		(a) Benchmarks versus competitor prices (b) Customer value/price perception

Objectives	Internal	Measures
- To provide fast-track service to best customers		(a) Reduced lead time to specific customers (b) Customer satisfaction
- To remove interface costs/delays with agents		(a) Cost of rework (b) Number of referrals

Objectives	Innovation	Measures
- To reduce new product lead times by 30%		(a) Design to sale time (b No slack in elapsed time
- To find new channel to reach SME customers		(a) New channel exists (b) Number of options reviewed/tested

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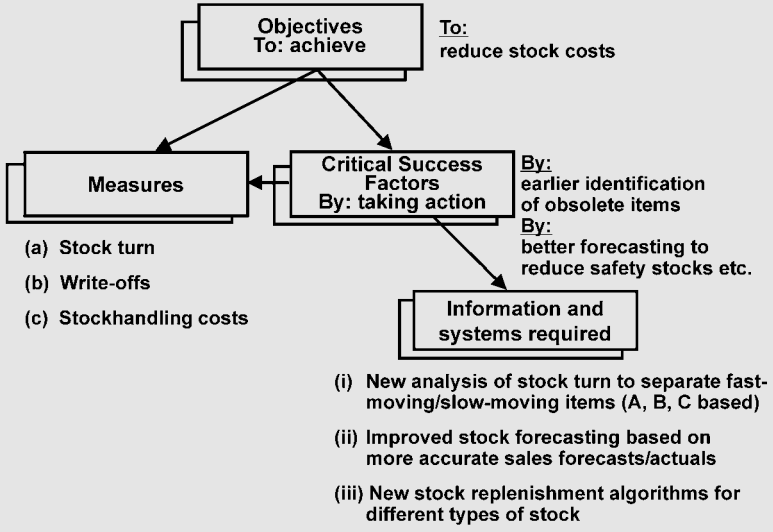
Using CSF analysis, the focus shifts to identifying the actions necessary to support each objective. So, for example, one of the objectives is to reduce stockholding costs. The CSFs with respect to this objective are:

- earlier identification of obsolete items;
- improved forecasting to reduce safety stock.

As illustrated in the figure below, working from the CSFs, we can determine both the information and systems requirements in order to support these CSFs:

- new analysis of stock-vturn to separate fast-moving/slow-moving items (A, B, C-based praeto analysis);
- improved stock forecasting based on more accurate sales forecasts/actuals;
- new stock replacement algorithms for different types of stock.

Deciding which systems to ultimately develop depends on business priorities.



The outputs from Balanced Scorecard work and the CSF analysis can then be consolidated, as illustrated below.

Financial perspective			
Objectives	**Measure(s)**	**Action (CSF)**	**IS Needs**
- To reduce stock costs	a) Stock turn b) Write offs c) Stockhandling costs	- By earlier identification of obsolete items - By better forecasting to reduce safety stocks	i) New stock turn analysis (ABC) ii) Improved sales and stock forecasting iii) New stock replenishment algorithms

Customer perspective			
Objectives	**Measure(s)**	**Action (CSF)**	**IS Needs**
- To increase responsiveness	a) Order to delivery lead time b) Enquiry response time	- By identifying causes of all late deliveries - By informing customers in advance of problems - By tracking all enquiries/ progress daily	i) New accurate measure of all order/delivery times ii) Analysis of all types of delivery failure iii) New/dynamic customer/ order monitoring system to instigate action iv) New enquiry recording/ tracking process and system

Ultimately, as a result of process analysis, a decision may be made to embark upon major redesign of one or a number of business processes. Whatever the outcomes, the IS/IT elements can be determined and assessed and built into the IS demand.

The assessment of business processes is aimed at defining the areas where the greatest opportunities exist to improve performance. At the highest level, an initial assessment can be made of how effective the current processes are in meeting the business objectives and drivers. A second assessment can then be made to predict how effective the processes could and should be in making their fullest contribution to the drivers. For example, if the driver relates to increased market share, then the customer acquisition processes would expect to play a greater role in achieving this than the process for servicing existing contracts, although both would have potential for making a worthwhile contribution. Comparing current and potential performance gives an indication of the gap that could be made up by improving the process.

Adopting a Process Perspective

Over a decade after the concept of business process re-engineering emerged, the majority of organizations are still structured along functional (or departmental) lines, with each having their own hierarchy. The 'chain' of linked departments allows for specialization where the overall task is broken down and people with specific expertise can be applied as required. Such specialization of labour, whether on the manufacturing shop floor or within offices, has been a normal way of working for a long time. 'Levels' of seniority evolve within these functions to form the organizational hierarchy. This model is so widely established that it has rarely been questioned. BPR is a concept that questions this 'functional' way of thinking and makes 'processes' a central focus for organization design.[21] In short, processes are becoming the building blocks of organizations and seek to capture natural workflows (see Figure 4.8).

A process focus means examining the way a customer order is fulfilled, a new product developed or a customer account established without concern for functional boundaries or specialization. For example, when requesting repair of a telephone fault, the customer is not generally interested in which department the engineer works for, whether he travels by public transport or buys spare parts in the local hardware shop, as long as the service is restored.

The *Oxford English Dictionary* defines process as *a continuous and regular action or succession of actions, taking place or carried out in a definite manner, and leading to the accomplishment of some result; a continuous operation or series of operations*. In its simplest form, a process has an input and an output and is made up of a sequence of individual activities through which this input passes to become an output. With this traditional view, the process itself can be anything that transforms, transfers or merely looks after the input and delivers it as output. Organizations adopting a process approach find that, for example, many of the steps in their order cycles have nothing to do with delivering the required outcomes.[22] Indeed, it is sometimes difficult to identify why some steps exist at all! Often, it is for no better reason than because they always have! Getting rid of all these unnecessary steps can result in faster throughput or quicker customer service and at considerably lower cost.

However, the traditional view of a process being composed of activities can be problematic, particularly in information and knowledge industries. In such contexts, it is perhaps more appropriate to view the process in terms of *roles*, with a process portrayed as a number of roles collaborating and interacting to achieve a goal. This perspective can be extended to make explicit reference to behaviours: a process is an organized collection of behaviours that satisfies a defined business purpose,

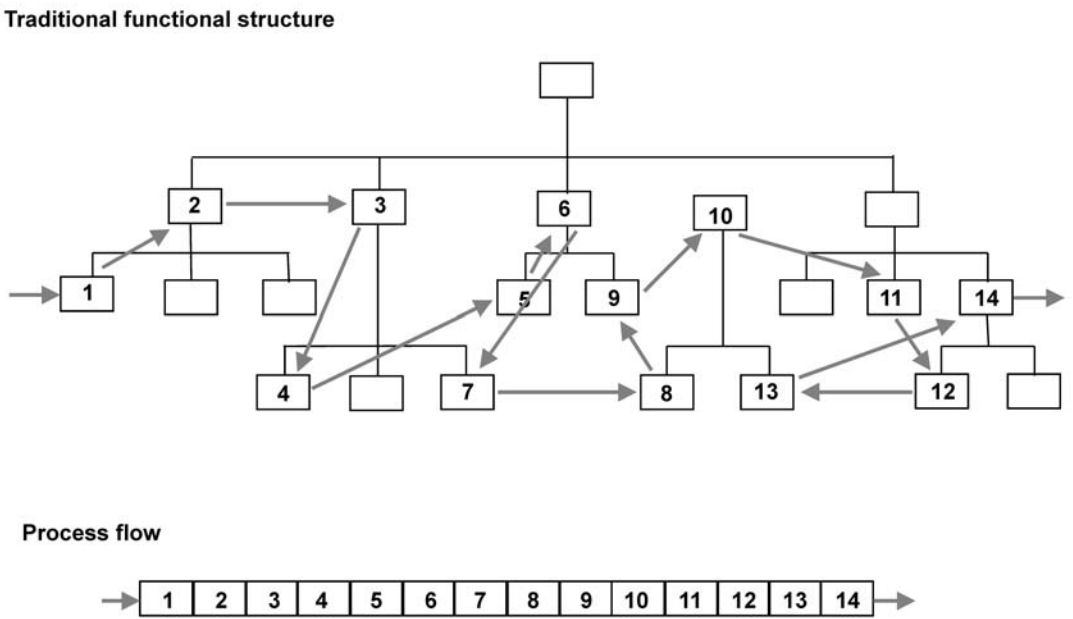


Figure 4.8 *Adopting a process orientation*

performed according to specific targets. This view is of relevance in knowledge work or in areas where there is a high degree of interaction between people. For example, specifying the precise activities in customer service processes is difficult, if not impossible. Guidelines as to the behaviour to be exhibited can be given, however attitude is often the crucial ingredient in determining whether or not a customer is satisfied.

Many IT implementations have focused on automating traditional ways of working that existed at that time—existing work practices remain. However, an order-to-fulfilment process could be further enhanced by examining the fundamental assumptions that underlie the design of this process with a view toward radically redesigning how work is performed. For example, the assumption that salespeople take orders, or the assumption that accounting staff perform credit checks, or the assumption that payment is made on receipt of an invoice, guide the design of the process. Why can't the customer phone, fax or electronically send (via the Internet) the order directly to the factory, where, using expert system technology, the order can be verified, a credit check performed, availability of stock determined and shipment to customer arranged? Purchase orders could also be sent electronically to suppliers. The company could also consider the introduction of 'invoiceless processing', where customers submit payment based on receipt of goods rather than on receipt of an invoice, subject to the usual credit terms and conditions. This is how Dell and Cisco operate.

This, in essence, represents the fundamental message of business process re-engineering. It is not merely automating existing work practices but seeking opportunities where existing ways of working can be totally transformed. The power of information technology, in particular, provides the opportunity for new and innovative ways of organizing and enabling organizational work to be performed in ways that are not possible manually. Box 4.3 provides a summary description of approaches to redesign.

Identifying Processes

Despite the intuitive appeal of processes, identifying and understanding processes is not as simple as it might at first seem. For example, in the delivery of most products and services, companies operate a highly complex set of processes. A key challenge, however, is to identify processes and define them at an appropriate level. Evidence suggests that many organizations are redesigning processes that make little contribution to business success as a whole, even if the processes selected are successfully redesigned. Performance improvements reported are very often expressed relative to the process being redesigned rather than the business unit as a whole. Although such results may look impressive in

Box 4.3 Approaches to redesigning processes

Once an organization has identified a process to be redesigned, how does it proceed in determining the new design? Having examined many BPR initiatives, two broad approaches to redesign can be identified: the *systemic approach* and the *clean sheet approach*.* In reality, however, organizations usually adopt a combination of both.

In adopting a systematic redesign approach, an organization maps out and attempts to understand an existing process and then work through it systematically to create new processes to deliver the desired outcomes. The clean sheet approach, on the other hand, demands a fundamental rethink of the way that the product or service is delivered and designs new processes from scratch.

Redesigning an already existing process or, for that matter, refining a newly-designed one, is usually about making it better, cheaper and/or faster. *Better*, in that it delivers higher levels of satisfaction to its stakeholders, particularly for customers. *Faster*, in that it does so as quickly as possible thereby also increasing responsiveness. *Cheaper*, in that it does the above to the highest levels of efficiency.

When redesigning existing processes, the emphasis is on the elimination of non-value-adding activities and the streamlining of the core value-adding ones. The rules for doing this can best be summarized using the acronym ESIA: *eliminate* all non-value-adding activities; *simplify* aspects of work where possible; *integrate* elements of the process and *automate* where appropriate. The table below highlights the main areas of attention within these four domains.

Areas of attention for systematic redesign (source: *J. Peppard and P. Rowland,* The Essence of Business Process Reengineering*, Prentice-Hall International, Hemel Hempstead, UK, 1995, p. 181)*

Eliminate	*Simplify*	*Integrate*	*Automate*
Overproduction	Forms	Jobs	Dirty activities
Waiting time	Procedures	Teams	Difficult activities
Transport	Communication	Customers	Dangerous activities
Processing	Technology	Suppliers	Boring activities
Inventory	Problem areas		Data capture
Defects/Failures	Flows		Data transfer
Duplication			Data analysis
Reformatting			
Inspection			
Reconciling			

With the clean sheet approach, assumptions implicit in the existing process are discarded and a fundamental rethink of the way the process is undertaken ensues. It is built on the premise that, to achieve significant performance improvement, work within the process must be done differently. The clean sheet approach is about working back from that target to a design that will make it happen.

Organizations adopt a 'clean sheet' approach either because in their opinion they have reached a 'breakpoint', or simply that previous attempts to re-engineer the existing processes through a systemic strategy have failed to result in any significant performance improvement. This is not to suggest that systematic redesign is any less creative or innovative. The main disadvantage of the clean sheet approach is that the required organizational changes can be difficult, though not impossible, to implement incrementally. Overall, with this approach the risk is higher and the pain and disruption greater. During implementation, a crucial problem, faced by many organizations who have used this method, is that the new processes differ so fundamentally from the existing ones that workers have great difficulty in relating to them. Unless great care is taken and management commitment is solid, workers may refuse to switch to the new methods of working.

Sometimes, organizations decide a new division or operation is necessary rather than try and change the existing organization. Midland Bank's decision to set up a separate telephone banking company, First Direct, and even General Motors' Saturn business unit are examples of this strategy. This 'greenfield site' approach has a number of distinct advantages; not least, the chance to design the facilities from scratch taking into account the latest thinking in organization and management and exploiting the latest technological innovations without having to deal with legacy systems. Creating the desired culture with a new workforce is also much easier than where significant to an existing one are required.

In reality, there is a great deal of middle ground between both methods with many organizations choosing a combination of the two. The choice between the two approaches will depend on what the organization is most comfortable with, and also on the timescales involved. Whichever alternative is selected, it is important to ensure that the analysis of existing processes is not overdone, though the danger of this is higher in the systematic redesign approach. Always remember that the objective, regardless of the approach

chosen, is to obtain significant improvement in performance. More attention should therefore be paid to the new process rather than the old, which is merely a starting point.

The redesign of any process is a creative activity and there are many techniques that can be used to get those involved in the redesign to engage in 'out of the box thinking'. There are also many software packages on the market specifically designed for process mapping. However, many companies simply choose to use large sheets of paper and Post-It notes with the same effect. It should be noted that any map is only to aid in understanding although the simulation facility provided by some packages can be used to good effect in modelling different redesign options. There are also a number of different process mapping techniques including simple flow charting, IDEF(0) and Role Activity Diagrams.

* A detailed description of both these approaches can be found in J. Peppard and P. Rowland, *The Essence of Business Process Reengineering*, Prentice-Hall International, Hemel Hempstead, UK, 1995.

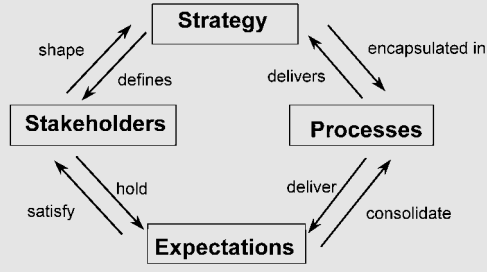
the context of the process prior to design, in reality they have little impact on the organization's overall competitiveness or profitability.

Hammer,[23] whose work has helped promote the concept of business re-engineering, acknowledges that process identification is almost certainly the most intellectually-challenging component of redesign. Identification is complicated because, as we have seen above, business processes cross departmental and hierarchical boundaries. In a factory, one can at least follow the flow of incoming material through to the point of departure of the finished product. This may be complicated, with many materials being combined into one; however, the physical flows are visible and can be identified and understood relatively easily. In services and office environments, it is much more difficult to understand a process that includes paperwork, and other forms of communications such as telephone calls, electronic messages and information, which must be followed.[24] In addition, many employees working in the process often have little idea of how the whole process works, how the output they create is used or even why it is produced. They often only understand their particular role and set of tasks. The nature of business processes is such that they can be construed as almost any activity that goes on in the organization—everything can be considered as a process—and consequently processes can exist at any level. An approach to identifying business processes based on their strategic importance and, hence, potential beneficial redesign is described in Box 4.4.

Box 4.4 Identifying processes (for more information on this method, see C. Edward and J.W. Peppard, 'Organizationalizing strategy through process', *Long Range Planning*, Vol. 30, No. 5, 1997, 753–767).

One approach to identifying processes is to examine the expectations of stakeholders and then determine the processes required to deliver these expectations. In Chapter 2, the influence and impact of stakeholders on business strategy was highlighted. Stakeholders hold a variety of expectations; through its marketing activities, the organization seeks to understand and often influence these expectations, particularly those of external constituents.

The figure below illustrates a view of the relationship between strategy, stakeholders, expectations and processes. In this model, the interplay between strategy and stakeholders is critical: the strategy of the business defines who the stakeholders are, and stakeholders themselves shape the strategy. These expectations, when consolidated in the context of the business strategy, define the requirements placed upon the organization and the processes that will deliver them. It is these processes, when executed, that deliver these expectations that in turn satisfy stakeholders. In effect, the strategy is defining the required processes but indirectly via stakeholders and expectations.



The technique works by first listing out the expectations of each stakeholder, placing some level of priority against each expectation. Then, for each stakeholder expectation, determine whether an already identified process exists to satisfy that expectation. For example, with a new expectation, a process will need to be created (as by definition no process can yet have been created); an example of this may be 'to educate visitors', which results from an expectation on the part of visitors to a zoo to be educated. For another

expectation, management need to decide if it is to be met by the existing process or if a new process needs to be originated. This decision involves considering if an existing process fully matches the expectation described and the degree of importance of that stakeholder and that expectation to the organization. If no existing process is able to deliver the expectation, then a new process is originated. If an existing process only partly meets the expectation and if satisfying the expectation is critical to the strategy, then a further process will need to be created; or an existing process needs redesigning to include meeting the expectation. Each time an expectation is subsumed into a process, or a new process is originated, the list of performance measures for that process must be updated to reflect the enlarged scope of the process or the amended process focus. The link between expectation and process should be documented for later consideration.

To reiterate, processes are seen as consolidations of stakeholder expectations and reflect *what* the organization must do. It does not include an indication of *how* it will be undertaken or *who* is to do it; this is determined in the design of the process. Processes themselves do not actually do anything: they exist to provide focus for achieving a desired outcome (i.e. an expectation). They are a device to enable a grouping of the activities and/or roles that will be required to be performed if the outcome is to be achieved. In other words, a collection of activities are the physical manifestations of a process. For example, the process 'to educate customers' visiting a zoo could be satisfied in a multitude of ways (e.g. installing a multimedia computer beside each cage, providing human guides or issuing a leaflet for later reading). It is a management decision to evaluate and select the particular set of activities that are appropriate to achieve the process.

Processes defined at an organizational level can be broken down into more detailed sets of subprocesses. These subprocesses, in turn, can also be decomposed into further levels of detail and so on until we reach the level of the individual task or role.[25] It is important in re-engineering that the processes selected for redesign or benchmarking are meaningful to the organization, if significant benefits are to be achieved.

Process redesign has wider implications than merely redesigning how a process operates and implementing new technology. Job descriptions will

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probably need to be rewritten, multifunctional job skills and the ability to work in teams becomes a priority, performance measurement and reward systems fostering individuality or functional priorities and internal competitiveness must be revised, new information systems must be designed and implemented. This can entail behavioural and cultural changes within the organization. Invoiceless payment, for example, demands a much closer and trusting relationship with customers and suppliers that may require a mindset change by management in their attitude toward suppliers, and even customers!

Process Importance–Performance Assessment

To identify potential candidates for redesign, it is useful to examine the importance of the processes to achieving business objectives and addressing the business drivers and plot this against the organization's performance in this process *vis-à-vis* competitors (see Figure 4.9). This importance–performance matrix[26] helps focus attention on those areas that are in most need of improvement. The matrix can also be used to obtain stakeholder feedback, and it is often interesting to contrast the views obtained from internal stakeholders with those from external stakeholders. Benchmarking may also be necessary to assess actual and relative performance.

American Express adopted a variant of this approach when selecting processes suitable for redesign. The primary criteria was on the gap

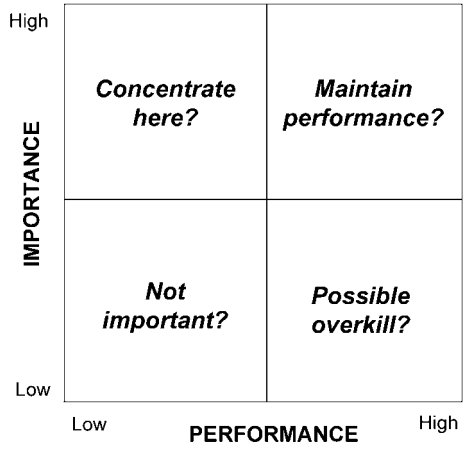

Figure 4.9 *The importance–performance matrix*

between their stakeholders expectations and their current performance and the potential impact this gap could have on their continued growth.[27] On the basis of these criteria, they decided to focus on two processes: travel service delivery (travel reservations and ticketing) and customer relationship management. The travel service delivery process was falling short of the expectations of both customer and shareholders as measured by the company's service performance monitor—the monthly tracking of customer satisfaction—and margins, and this underperformance was limiting growth prospects. The process underlying the management of customer relationships had become so complex that they hindered employees in meeting customers' needs, as measured by the company's annual survey of key contacts at client corporations.

ORGANIZATIONAL MODELLING

Organizational modelling is a structured technique used to ensure comprehensive examination and documentation of a business and its IS/IT environment. It is a valuable technique in IS/IT strategy development, and, if the business is also conducting any business re-engineering exercises, this or a similar means of obtaining a very broadly-based understanding of the organization is essential.

There are a number of different techniques that can be used. The organizational model at the heart of this technique, which is described here, is based on original work by Kotter.[28] This model of the organization is made up of seven elements: a central 'process' element labelled core business processes and six 'structural' elements—the external environment, employees and other tangible assets, formal organizational arrangements, the internal social system, the organization's technology and the dominant coalition. In his book, Kotter[29] developed a set of questions to understand the nature of the organization, although it is not expected that definitive answers can be obtained for all the questions. What is needed is a sensitivity to the potential relevance of each element or variable in the model, combined with an understanding of the activities within the organization and the information required to support these activities.

The original work by Kotter has been substantially modified and enhanced for the particular purpose of IS strategy formulation. Generally, the questioning approach is conducted on a macro-basis for the organization as a whole and in micro-form for the IS function itself. The questioning is tackled as part of the overall assessment process, where the main focus is on determining objectives, activities and information flows, in relation to the model, so that an appropriate representation

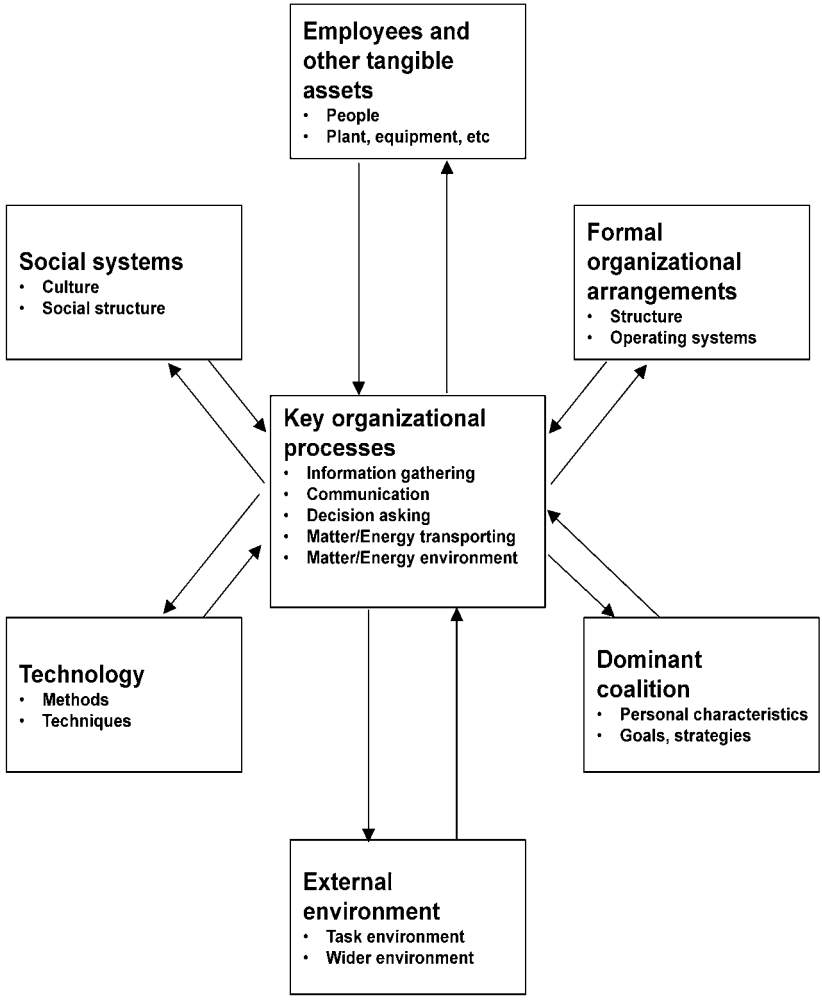

Figure 4.10 *The organizational model: environment and culture (*source: *adapted from J.P. Kotter,* Organizational Dynamics: Diagnosis and Intervention*, Addison-Wesley, Reading, Massachusetts, 1978)*

of the organization and how it functions is developed and understood by the senior management. Figure 4.10 shows the components of an organizational model, which can be built up in the following way:

- *The external environment*—questions are asked concerning the impact of legislative and fiscal policy, industry and economic trends, the basis of competition in the particular industry, industry

standards, competitor practices and products, as described in Chapters 2 and 5.

- *The dominant coalition*—these are the key internal influencers who constitute the driving force behind the organization: What are their values? What are their aims? How do they work together as a team? What is the source of their power and influence, and how do they see the future of the organization? It is essential to identify this group because they will need to be convinced of the need for changes in information systems for competitive advantage; without their commitment, there is little likelihood of success. This topic is considered again in Chapter 8.
- *Formal organizational arrangements*—the plans, budgets, organization charts, job definitions, performance measurement and control systems are reviewed in order to develop an understanding of how the organization records the way in which it operates.
- *Employees and other tangible assets*—the quality and quantity of people, their skills and training and the level of turnover, and the physical, intellectual property and financial assets of the organization.
- *Social structure*—the formal arrangements within the company are reviewed along with employee and trade practices and relationships with trade unions, if applicable. The informal arrangements and customs and practices, staff attitudes to management and other workers, and to employee policies are also reviewed.
- *Technology employed*—the level of use of technology within the enterprise itself, in relation to the available technology and that used industry-wide, is also determined. This is not just concerned with IT but includes a 'catalogue' of the main hardware and software within the enterprise.
- *The core processes*—these are the processes and activities within the organization that convert the raw material into the finished products or bring resources together to deliver services.

Extracts from the questionnaire to help in constructing the model, developed from Kotter's original, are included in Box 4.5. Sample questions only have been included from a complete set of over 100. They are intended to give an indication of the depth and breadth of detail that may be elicited. Without this kind of model, it is very difficult to develop strategies for information systems that are consistent with the values and culture of the organization. In his book, Kotter described how to use the model to bring about organizational change. This is often a feature of implementation of strategy and, in its subsequent management, provides further justification for adopting this type of technique.

Box 4.5 Organizational modelling: extracts from a sample questionnaire to elicit required facts and options (*source:* adapted from J.P. Kotter, *Organizational Dynamics: Diagnosis and Intervention*, Addison-Wesley, Reading, Massachusetts, 1978)

A The External Environment

1. What are the key external groups that the organization has to take notice of?
2. Who dominates/determines the development of the industry?
3. What is the industry growth, maturity, size, etc.?
4. What makes for success in that particular industry?
5. How dependent is the organization on the external groups and what influence does it have over them?
6. What is the basis of its own power?
7. What is the industry value chain? How intense is the information value-added?
8. Could IT be used to increase customers' switching costs?
9. How are competitors/suppliers/customers using IS/IT?
10. Is there potential for pre-emptive use of IT with customers/suppliers?

B The Dominant Coalition

1. Describe individually, for the key power holders, their personal skills, attitudes and motives and how they think the organization should be run.
2. How do they work as a group?
3. How do they seem to look at the future of the organization?
4. How powerful are they really in the organization, and where does such power come from?

C The Formal Organization Arrangements

What formal procedures exist for:

1. Corporate strategy and planning?
2. The financial control of unit performance? The measurement of individual or unit performance?
3. Controlling information (i.e. is information being managed as a resource)?
4. Deciding directives for information systems users or IS/IT?
5. Determining policy with respect to distributed processing, use of personal workstations, etc.?
6. Determining corporate or SBU strategy?

7. Reporting of IS/IT? Is its top manager part of the senior management team?
8. IS strategy and does this relate to corporate strategy?

D Employees and Other Tangible Assets

1. What are the organization's main physical and financial assets?
2. How many employees are there and of what general types?
3. Are the physical assets in good condition and up to date?
4. Are there strict financial limits imposed on the IS function or can projects proceed on the basis of justifications?
5. Comment on the existing application portfolio. How adaptable is it; how integrated, how cohesive?
6. Comment on the relative maturity of the IS organization.

E The Internal Social System

1. What are the attitudes of the employee groups to company loyalty, hard work, cooperation with management and cooperation among themselves?
2. Are there any special cultural values that employees hold that affect the organization?
3. Are IS/IT personnel formally organized into groups or unions?
4. What is staff turnover? What are the recruitment and career development policies?

F The Organization's Technology

1. What main techniques are used to produce the most important product of the organization?
2. What are the products and potential substitutes?
3. What is the information content of the products/services?
4. Can IT change the products/product life cycles/production economics?

With particular reference to company-based information systems:

5. Is the installation relatively large or small?
6. Is computer power centralized or distributed?
7. What is the degree of flexibility within the IS/IT environment?
8. Does the technology have a high or low impact on the enterprise itself?
9. How much is there by way of telecommunications, office automation, new technology, etc.?
10. How are the costs of IT passed on to the users?
11. How are IS investments evaluated and prioritized?

G The Key Organizational Processes

1. What does the organization require so that it can operate (e.g. raw materials, energy, information, special skills, etc.)?
2. Are any of these especially costly or difficult to obtain?
3. How are these resources converted into goods or services?
4. How are the goods or services disposed of?
5. How does change come to be considered?
6. In IS/IT, are there any steering committees or groups giving guidance and direction?
7. How are key decisions made in IS/IT? Are there any user consultative groups? Are consultants used for second opinion? How much authority does management have?
8. How is IS/IT performance measured/objectives set?
9. How is any R&D funded?
10. What formal systems are used for development (methodologies)?
11. Is there an information centre and does it include PCs?
12. How does use of resources compare with strategic importance of applications?
13. Is maintenance separate from development and does it include enhancements?

There are three main reasons for developing the organizational model:

1. When embarking on an IS strategy process, there are a multitude of options available to the organization. It may want to develop new management information systems, or there may be a focus on obtaining competitive advantage. However, the strategy development and planning activities need to be completed quickly so that the enthusiasm and commitment that develop during the process can be sustained and so that work can start toward achieving the benefits of these improved systems. It is necessary, therefore, to have an effective filtering system so that the most relevant, realistic and implementable applications are considered for the future. The organizational model provides an effective filtering mechanism, since it contains substantial information about the resources that could be made available to implement systems, the culture of the organization, and its values and priorities. It helps prevent proposals for new information systems that would be unable to be resourced or that would be totally foreign to the culture.

2. However, it may be essential to implement new systems and strategies that require changes in behaviour and run counter to the current culture of the organization. If that is so, then the behaviours, and perhaps even the culture itself, needs to be modified. Here, the model is of considerable benefit because the required cultural changes can be compared against the model to determine their impacts and how to effect them. It is for this reason that it is suggested that two models be developed: the macro-version for the organization as a whole and the micro-version for the IS function, since almost inevitably there will be changes required to both.
3. The third, important use of the organizational model is to provide a comprehensive collective understanding of the environment, both external to the organization and internally, precisely when strategic decisions are taken. This is important because, when the strategy is revisited, questions may be asked why certain options were discarded or why certain choices were made. Without this historical perspective, it would be difficult to answer those questions, which could result in work being performed again or, worse, a decision being reversed, to the detriment of the organization. It also provides the perspective against which changes can be monitored. There will be a finite elapsed time before revisiting the strategy, and, during that time, changes will take place in the external environment concerning competitors, the legal environment and the economic situation, and, internally, concerning the way in which employees work, new salary structures and so on. It is important to know the impact that all these may have on future strategy. The model provides a way of examining these changes to determine their possible impacts. It will enable systems to be developed and implemented that are sensitive to the influences of the various pressure groups and stakeholders.

As mentioned above, it is worth considering developing a second organizational model for the IS function itself. This is often necessary because the IS function has its own particular culture, values and methods of working, which may be quite different from those of the rest of the organization. It may be possible to develop a good IS strategy that fulfils all the criteria of supporting the business and being accepted by senior management, but which is unimplementable due to its not being accepted by the IS function or beyond its existing capability. The relationship between the IS function and the rest of the business is explored in Chapter 8.

EVALUATING THE GAP BETWEEN CURRENT AND REQUIRED IS/IT ENVIRONMENTS

The IS/IT requirements that result from this process form the basis of a framework within which we can critically assess the IS strategy itself. It consists of candidate developments to build or enhance applications and schemes to upgrade the provision of IT resources. Unless the strategy process has focused on a very small number of critical initiatives that will be certain to go ahead, the IS demand and IT supply proposals will need to be prioritized against the business objectives, either on their own merits or in conjunction with the business plans that they support. This stage, resulting in an application portfolio development plan, is discussed in Chapters 6 and 7.

The IS demand is the main deliverable to come out of the analysis of the current situation and the business needs, stemming from its strategy and the collection of demands from the current business operations. It will also contain the needs arising out of analysis of the external business environment. This chapter has concentrated on the current business needs that usually produce short-term IS requirements and medium-term requirements that arise from the business strategy. Chapter 5 will move the analysis out to a longer-term horizon, in seeking new ways of impacting the business through IS/IT.

The assessment of the current IS/IT environment indicates the capabilities of existing IS/IT resources in relation to the *known* business strategy. There will almost certainly be a gap between the current resources and competencies and those needed to satisfy the future IS demand. The gap identifies the requirements for change:

- Processes in need of recognition, simplification, streamlining or redesign—all with significant IS/IT requirements.
- New or upgraded information resources. The list of information needs can be compared with current systems and databases to determine where the new information will come from or whether new sources must be found. Quite often, new information needs can be fulfilled by relatively minor modifications to existing systems or databases. Obviously, these could be tackled in the short term. Other information needs may only be satisfied by developing new applications, and will take longer to be implemented.
- Changes in IT supply resources and competencies to support the role IS/IT needs to play.

By analysing the coverage of systems across the core business processes, it is possible to consider and compare a disparate set of information systems requirements across the whole organization and put them into proper context related to the benefit to the business. For example, the production engineering department may wish to invest heavily in systems that will enable the factory to respond quickly to customer orders, the marketing department may want to spend money on developing analytical CRM systems to segment markets and develop propensity models, and the sales department may want to spend money on developing a system to increase salesforce productivity in managing contacts and generating repeat orders. It would be very difficult for anybody to say which of those three systems should be developed first without reference to the overall strategy and priorities of the organization.

SUMMARY

This chapter has introduced one part of the process of determining the IS strategy, by getting a good understanding of the current situation in the business and by eliciting IS requirements that are inherent in the existing business strategy to achieve a high degree of alignment between the two. The main stages involved in establishing the current situation and logical requirements are fact finding, analysis and interpretation. The processes occur iteratively and rely heavily on each other. The purpose is to identify the activities and business processes that support the objectives and strategy of the business, and the associated information requirements. The 'fact finding' can result in a large volume of information, which needs to be recorded in a way that facilitates analysis and interpretation. Whether the data are text, lists, tables or graphical models, they can be recorded in a number of ways, but need to be structured. The various modelling and analysis tools described here help with structuring and comparison of information derived from different sources. Some of the information will be associated with the business strategy, where the strategy components afford a natural structure; some may result from organizational modelling, which offers a further structure for recording much of the 'soft' information.

The key points to draw from this chapter are:

- there is a process for fact finding, which needs to be followed if the relevant information for defining the IS strategy is to be obtained;
- the techniques for analysis must provide sufficient insight and interpretation for developing the IS/IT strategy, but no more;
- the analysis task is not trivial and a variety of modelling and assessment techniques will need to be used and the outputs reconciled;

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- while the techniques discussed in this chapter are essentially analytical and logical, rather than creative, going through the processes will almost certainly generate a number of original and creative ideas. These need to be captured and developed.

But, this is only one side of the picture of determining the IS strategy; in order to enrich this strategy by looking for new ways to *impact* the business and strengthen its competitive performance, more creative techniques have to be brought to bear. This is the subject of the next chapter.

ENDNOTES

1. Business process re-engineering was initially referred to as business process *redesign*.
2. The report of this project can be found in M. Scott Morton, ed., *The Corporation of the 1990s: Information Technology and Organizational Transformation*, Oxford University Press, New York, 1991. See also T.H. Davenport and J. Short, 'The new industrial engineering: Information technology and business process redesign', *Sloan Management Review*, Summer, 1990, 11–27.
3. These examples are elaborated on in M. Hammer, 'Re-engineering work: Don't automate, obliterate', *Harvard Business Review*, July–August, 1990, 104–112 and M. Hammer and J. Champy, *Re-engineering the Corporation: A Manifesto for Business Revolution*, Nicholas Brealey, London, 1993.
4. Research highlights that many re-engineering initiatives fail. See CSC Index, *The State of Reengineering*, CSC Index, London, 1994; K. Grint, P. Case and L. Willcocks, 'Business process reengineering reappraised: The politics and technology of forgetting', in W.J. Orlikowski, G. Walsham, M.R. Jones and J.I. DeGross, eds, *Information Technology and Changes in Organisational Work*, Chapman & Hall, London, 1996, pp. 39–61; G. Hall, J. Rosenthal and J. Wade, 'How to make reengineering really work', *Harvard Business Review*, November–December, 1993, 119–131.
5. See Hammer and Champy and others.
6. E.V. Martinez, 'Successful reengineering demands IS/business partnership', *Sloan Management Review*, Summer, 1995, 51–60.
7. T.H. Davenport and J.E. Short, 'The new industrial engineering: IT and business process redesign', *Sloan Management Review*, Summer, 1990, 11–27.
8. J.T.C. Teng, V. Grover and K.D. Fielder, 'Redesigning business processes using IT', *Long Range Planning*, Vol. 27, No. 1, 1994, 95–106.
9. D.E. Avison and G. Fitzgerald, *Information Systems Development: Methodologies, Tools and Techniques*, second edition, McGraw-Hill, London, 1995.
10. D.E. Avison and A.T. Wood-Harper, *Multiview: An Exploration of Information Systems Development*, Blackwell Scientific, Oxford, 1990.
11. P. Checkland, *Systems Thinking Systems Practice*, John Wiley & Sons, Chichester, UK, 1981; and P. Checkland and S. Holwell, *Information, Systems and Information Systems: Making Sense of the Field*, John Wiley & Sons, Chichester, UK, 1998.
12. A.-W. Scheer, *ARIS—Business Process Frameworks*, second edition, Springer Verlag, Berlin, 1998; A.W. Scheer and F. Habermann, 'Making ERP a success', *Communications of the ACM*, Vol. 43, No. 4, 2000, 57–61; T.W. Malone, K. Crowston, J. Lee, B. Pentland, C. Dellarocas, G. Wyner, J. Quimby, C.S. Osborn, A. Bernstein, G. Herman, M. Klein and E. O'Donnell, 'Tools for inventing organizations: Towards a handbook of organizational processes', *Management Science*, Vol. 45, No. 3, 1999, 425–443.
13. J.W. Peppard and J.M. Ward, ' "Mind the gap": diagnosing the relationship between the IT organization and the rest of the business', *The Journal of Strategic Information Systems*, Vol. 8, 1999, 29–60.
14. D.K. Carr and H.J. Johansson, *Best Practices in Reengineering: What Works and What Doesn't in the Reengineering Process*, McGraw-Hill, New York, 1995; M. Hammer, *Beyond Reengineering: How the Process-Centred Organization is Changing Our Work and Our Lives*, HarperCollins, London, 1996; M. Hammer and S.A. Stanton, *The Reengineering*

Revolution: A Handbook, HarperBusiness, Sydney, Australia, 1995; G.A. Pall, *The Process-Centered Enterprise: The Power of Commitments*, St Lucie Press, Boca Raton, Florida, 2000; J.W. Peppard and P. Rowland, *The Essence of Business Process Reengineering*, Prentice-Hall, Hemel Hempstead, UK, 1995.
15. N. Venkatraman, *The Value Centre*, presentation made at Cranfield School of Management, February 1996.
16. R.S. Kaplan and D.P. Norton, *The Balanced Scorecard: Translating Strategy into Action*, Harvard Business School Press, Boston, Massachusetts, 1996; *The Strategy-Focused Organization: How Balanced-Scorecard Companies Thrive in the New Business Environment*, Harvard Business School Press, Boston, Massachusetts 2001.
17. J. F. Rockart, 'Chief executives define their own information needs', *Harvard Business Review*, March–April 1979, 81–92.
18. M.E. Shank, A.C. Boynton and R.W. Zmud, 'Critical success factor analysis as a methodology for MIS planning', *MIS Quarterly*, Vol. 9, No. 2, 1985, 121–129.
19. M. Hardaker and B.K. Ward, 'Getting things done: How to make a team work', *Harvard Business Review*, November–December, 1987, 112–120.
20. J.F. Rockart and A.D. Crescenzi, 'Engaging top management in information technology', *Sloan Management Review*, Summer, 1984, 3–16.
21. It should be noted that manufacturing has always taken a strong process perspective. Different product types, depending on volume and variety, require differing process configurations.
22. For more on the order-to-fulfilment process see W.E. Hoover Jr, M. Tyreman, J. Westh and L. Woolung, 'Order to payment', *McKinsey Quarterly*, No. 1, 1996, 37–49; and B.P. Shapiro, V.K. Rangan and J. Sviokla, 'Staple yourself to an order', *Harvard Business Review*, July–August 1992, 113–122.
23. See M. Hammer and S.A. Stanton, *The Reengineering Revolution: A Handbook*, Harper-Collins, London, 1995.
24. For an interesting example of a hospital that was redesigned around patient flows, see J. Teboul and J. Tabet, *Karolinska Sjukhust*, INSEAD Case, Fontainebleau, Paris, 1995 (European Case Clearing House reference 695-008-1).
25. Even a task or activity can be considered a process (or subprocess) in its own right; however, it is not the objective of this chapter to enter into this debate.
26. The intellectual basis for this matrix is drawn from J.A. Martilla and J.C. James, 'Importance-performance analysis', *Journal of Marketing*, January, 1977. For an excellent extension of this work and its application to operations management, see N. Slack, 'The importance–performance matrix as a strategic improvement priority tool in service operations', *Warwick Operations Papers*, Warwick Business School, University of Warwick, UK, 1993.
27. R. Ballou, 'Reengineering at American Express: The Travel Services Group's work in process', *Interfaces*, Vol. 25, No. 3, 1995, 22–29.
28. J.P. Kotter, *Organizational Dynamics: Diagnosis and Intervention*, Addison-Wesley, Reading, Massachusetts, 1978.
29. J.P. Kotter, *Organizational Dynamics: Diagnosis and Intervention*, Addison-Wesley, Reading, Massachusetts, 1978.